

# The Mining Journal

## RAILWAY AND COMMERCIAL GAZETTE.

FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.

No. 670.—VOL. XVIII.

London, Saturday, June 24, 1848.

[PRICE 6D.]

### Stannaries of Cornwall—In the Vice-Warden's Court.

PURSUANT to a DECREE of the VICE-WARDEN'S COURT, made in the cause of TYACKE & OTHERS v. TEAGUE & ANOTHER, the CREDITORS in respect of WHEAL ANN MINE, in the parish of WENDRON, within the said Stannaries, are, on or before the 1st day of July next, to come in and PROVE their DEBTS before the Registrar of the said Court, at his office, in Truro; or, in default thereof, they will be peremptorily excluded the benefit of the said Decree.

Dated Registrar's Office, Truro, June 21, 1848.

### Stannaries of Cornwall—In the Vice-Warden's Court.

PURSUANT to a DECREE in the VICE-WARDEN'S COURT, made in the consolidated causes of BURGESS v. ALDERSON, COOMBE & BICE, the CREDITORS in respect of ROCKS CONSOLIDATED TIN MINES, in the parishes of ROCHE and SAINT AUSTELL, within the said Stannaries, are, on or before the 3d day of July next, to come in and PROVE their DEBTS before the Registrar of the said Court, at his office, in Truro; or, in default thereof, excluded the benefit of the said Decree.

Dated Registrar's Office, Truro, June 21, 1848.

COMBMARTIN MINES, NEAR ILFRACOMBE, NORTH DEVON.—TO BE SOLD, BY AUCTION, by Mr. GHEARSON, on Wednesday, the 28th day of June inst., all the STEAM-ENGINES, and remaining UNSOLD LOTS of MINING MATERIALS, consisting of—

- 1 Excellent 50-inch cylinder PUMPING-ENGINE, 9-feet stroke in cylinder, and 8-ft. stroke in shaft, with two boilers—together about 24 tons.
- 1 Excellent 26 and 50-inch Sims's combined cylinder PUMPING-ENGINE, 9-feet stroke in cylinder, and 8-feet stroke in shaft, with one boiler, about 10 tons.
- 1 Excellent double-acting STEAM-WHIM, 14-inch cylinder and boiler, about 5 tons, with crushing apparatus, stamps, and lifters, complete.
- 1 7-inch HYDRAULIC PRESSURE-ENGINE, complete.
- A great quantity of 7, 8, 9, 10, 11, 12, and 14-inch PUMPS, with working barrels, H-pieces, doorpieces, and windbores to match; 1 1/4-inch and 1 1/2-inch plunger-pole.
- 1 STAMPS WATER-WHEEL, 24-ft. diameter, 20-inch breast, with lifters and stamp-heads; 2 horse-whims, capfans, shears, and sheaves.
- A great quantity of TIMBER, of various scantlings; and IRON-WORK of different descriptions. *The Sale to begin precisely at Ten o'clock in the forenoon.*

For viewing the above and for particulars, apply to the agents on the mines, or to the auctioneers, Barnstable.

N.B.—Should the engines and pumps be previously disposed of by private contract, due notice will be given thereof.

HERDSCOOMBE MINE.—FOR SALE, BY PRIVATE CONTRACT, HERDSCOOMBE MINE MATERIALS, either together or in separate lots, consisting of—

- |                                |                                    |
|--------------------------------|------------------------------------|
| 3 9-feet 7-inch pumps          | 1 Balance-bob                      |
| 1 9-feet 6-inch working barrel | 1 Shaft-bob                        |
| 1 6-feet 6-inch doorpiece      | 2 Traveller-bobs                   |
| 1 9-feet 6-inch windbore       | Horizontal wood sweep-rod          |
| 1 Horse-whim                   | 30 Fathoms 2-inch square iron-rods |
| 2 4-feet whim-sheives          | 2 Winze kibbles                    |
| 2 Horse kibbles                | 1 Large stool—and                  |

A 16-inch cylinder DIRECT DOUBLE-ACTING ROTARY STEAM-ENGINE and BOILER, complete, with pumping and drawing apparatus attached.

This engine is in excellent condition—was erected new, about 18 months since, and the rotary and pumping apparatus about nine months, from the drawings, and under the superintendence of Messrs. Hocking and Loam, engineers; and, for cheapness of construction, efficiency, and economy, has given the most entire satisfaction.

Parties in want of an engine to sink 40 or 50 fathoms for trial, will find this one well adapted for that purpose, and should that prove satisfactory, and a larger pumping-engine be required, this can be applied wholly to drawing and crushing, with no expense, as her construction will admit of her being first placed in a proper position, at a distance from the shaft.

All particulars may be had of Mr. Matthew Loam, engineer, Liskeard, to whom all tenders, stating the highest prices, must be addressed.

EXTENSIVE IRON-WORKS FOR SALE. (UPSET PRICE REDUCED).

TO BE SOLD, BY PUBLIC ROUP, within the Royal Exchange Sale Rooms, Glasgow, upon Wednesday, the 12th day of July next, at Two o'clock in the afternoon (If not previously disposed of by private bargain),

### THE BLAIR IRON-WORKS,

Belonging to the Ayrshire Iron Co., situated in the parish of DALRY and county of AYR, together with the adjoining valuable MINERAL FIELDS of IRONSTONE, COAL, LIMESTONE, FIRE-CLAY, &c., held by the company under favourable leases.

The works, which have been recently erected at an immense cost, consist of two blowing engines, five blast-furnaces, workmen's houses, steam-engines for working the minerals, together with utensils at the pits, furnaces, &c., all in working order.

Also, the MALLEABLE IRON-WORKS, so far as erected—all as particularly described in former advertisements.

For further particulars, apply to Mr. Brown, at the company's office, 113, St. Vincent-street, Glasgow; Messrs. McClelland and McKenzie, accountants, Glasgow; Messrs. Montgomerie and Fleming, writers there; or to Messrs. Gibson-Craig, Dalziel, and Brodie, W.S., Edinburgh.

N.B.—The purchaser of these works has an opportunity of, at the same time, acquiring the Mansion-house, Lands, and Minerals of Pitcon, immediately adjoining (the latter being part of those above referred to, as held in lease by the company), which are advertised to be sold at the same time and place.—Glasgow, June 12, 1848.

VALUABLE ESTATE AND MINERAL FIELD, IN AYRSHIRE, FOR SALE.

TO BE SOLD, BY PUBLIC ROUP, within the Royal Exchange Sale Rooms, Queen-street, Glasgow, upon Wednesday, the 12th day of July next, at Two o'clock in the afternoon (unless previously disposed of by private bargain).

ALL and WHOLE THE LANDS and ESTATE of PITCON, extending to about 216 acres, imperial measure, as described in former advertisements, with the MANSION HOUSE of PITCON, and OFFICES and GARDEN, &c., thereto belonging; and the whole MINERALS and METALS in the said estate excepting these eight acres, or thereby, Scotch measure, now belonging to the Glengarnock Iron Company, of their presently working seam of ironstone in the said lands of Pitcon; and, also, excepting the Pitcon Railway and branches, in so far as the same are within, and pass through, the said lands.

The MANSION-HOUSE and OFFICES are in good repair, and the garden, shrubbery, and pleasure grounds, are in excellent order, and the whole are inclosed from the other portions of the estate, by a substantially built wall.

The LANDS let under lease (exclusive of those attached to the mansion-house), are held by a respectable tenant, at a surface rent of £900. These lands extend to about 140 acres, Scotch, or thereby, and the farm steading upon them is substantially built.

The MINERALS comprise the most valuable description of ironstone, extend to about 140 acres, still unwrought, and are at present leased to the Ayrshire Iron Company, at a fixed rent of £1,000 sterling per annum, or at a certain lordship, in the option of the landlord. Upon a moderate calculation, the black band yields about 3000 tons calcined ironstone to the imperial acre. There are several seams of coal and other minerals in the course of being wrought in the lands.

The public and parish burdens are small. This property is in the immediate neighbourhood of, and connected by railway communication with, the Ayrshire Iron Company's works (the Blair Iron-Works), which, along with the benefit of the mineral lease of Pitcon, are advertised to be sold at the same time and place with this estate.

For further particulars, application may be made to McClelland and McKenzie, accountants, 128, Ingram-street, Glasgow; Robert M'Cowan, accountant, 17, Gordon-street, there; Knox and Findlay, writers, 29, St. Vincent-place; there; James M'Cosh, writer in Dairy; or to Douglas and Ranken, writers, 81, St. George's place, Glasgow, in whose hands the articles of roup and title-deeds, and a plan of the estate, and mineral workings, may be seen.

Mr. M'Cosh will give directions for the lands being pointed out, and the mansion house, offices, and garden being shown to inquirers.

BOGLE and Co., Auctioneers.

Glasgow, June 19, 1848.

HEALY FIELD LEAD AND SILVER MINES, in the parish of LANCHESTER, in the county of Durham—FOR SALE, by PRIVATE CONTRACT, the above-mentioned MINES, together with all the MACHINERY and MATERIALS thereon.—These mines, which are held by lease from the Dean and Chapter of Durham, are now, and have been for many years past, in full course of working, and the produce has been considerable. The ore yielding a high per centage of lead, and from 20 to 25 ounces of silver to the ton. The mines are well stocked with water-wheels, and all machinery necessary for extensive operations, and the prospects for deeper and more extended trials are most encouraging.

The agent on the mines, Mr. Wm. Forster, is instructed to render every facility and information to parties visiting the mines; and for further information apply to Mr. Eddy, of Grassington, near Skipton, in the West Riding of Yorkshire, who is authorised to treat for the same, and by whom satisfactory reasons will be given for the retirement of the present proprietors.—Dated May 18, 1848.

TO BE SOLD, OR LET, a valuable COAL MINE, in the township of GREAT HARWOOD, in the county of Lancaster. The mine has been recently proved, and found to be 3 feet 2 inches in thickness, and of excellent quality; it is commonly called, or known, by the name of the UPPER MOUNTAIN MINE, and extends over about 1000 statute acres, which will be divided into suitable lots.

The property is situated between the towns of Blackburn and Clitheroe, and is intersected by a branch of the East Lancashire Railway.

A section of the borings may be seen, by applying to Mr. Boosie, Rufford-hall, Ormskirk; or to Mr. Whittle, coal viewer, Charnock Richard, Chorley—to either of whom proposals may be sent.

### TO IRONMASTERS AND MANUFACTURERS OF STEAM-ENGINES, BOILERS, CASTINGS, RAILS, BAR-IRON, &c. &c. &c.

MILTON IRON-WORKS.—TO BE LET, for a term of 21 years, and may be entered upon the 1st of October next, all those old-established IRON-WORKS, called

#### THE MILTON IRON-WORKS,

Situate near to the ELSECAR COAL-FIELD, and the TANKERSLEY PARK IRONSTONE GROUNDS, and at a convenient distance from the manufacturing towns of Sheffield, Rotherham, and Barnsley, in the county of York. The works consist of

#### TWO BLAST-FURNACES, with every requisite appendage.

FORGE and MILL, with puddling and other furnaces, chafery for drawing uses, rolling and slitting-mills, &c., capable of manufacturing from 90 to 100 tons of finished iron per week.

FOUNDRY, with pits, drying-stoves, and every requisite apparatus for making engine work and castings, of every description, to the extent of 100 tons per week.

ENGINE-FITTING SHOPS, with lathes, boring and planing machines, boiler-makers' and smiths' shops, and every requisite for carrying on engine and railway work to a large extent. Together with an ample supply of

ELSECAR COALS and TANKERSLEY PARK and SWALLOW-WOOD IRONSTONE, on terms to be agreed upon.

The works possess, at present, excellent canal and river communication, and will shortly have the advantage of the South Yorkshire Railway.

N.B.—Although the owner of the works would not absolutely restrain the lessees from making and manufacturing hot-blown iron, yet he would prefer treating with parties who would undertake to make and manufacture cold-blown iron only.

For further particulars apply to Mr. Newman, of Darley Hall, near Barnsley; or Mr. Woodhouse, of Overseal, near Ashby-de-la-Zouch.

Darley Hall, near Barnsley, June 15, 1848.

### FOR SALE, BY PRIVATE CONTRACT, separately or together, a nearly NEW STEAM-ENGINE, on the combined principle of Messrs. Harvey and Co., from the drawings of Mr. W. West, with 60 and 32-inch cylinders equal to 141-horse power. ALSO, TWO first-rate WATER-WHEELS and CONNECTIONS (one a 40-feet wheel, with brasses, &c.—the other a 30-feet wheel, 2 feet breast).

A QUANTITY of 11-inch PUMPS, and various other excellent MINING MATERIALS and MACHINERY.

May be seen at Wheal Martin Mine, near Stoke Climsland, Cornwall.

Offers and communications to be made to Mr. Davis, auctioneer, Tavistock; or Mr. Cole, at Winchester-house, 52, Old Broad-street, London.

### VALUABLE SEA-SALE COLLIERIES TO BE LET.

TO BE LET, and entered upon on the 1st of July next, the valuable current-working COLLIERIES of EVENWOOD and NORWOOD, in the county of Durham.

These collieries are situated upon the line of the Stockton and Darlington Railway, by which the coals are conveyed to the shipping ports of Stockton and Middlesborough; and also, by means of this, and the York and Newcastle, and Leeds and Thirsk Railways, the coals have access to the important land-sale trade of Northallerton, Thirsk, Ripon, York, the lead-mining districts, and other towns in Yorkshire, and for shipment on the Ouse; and, by means of the proposed Northern Counties Union Railway, with the important land-sale trade of the western parts of Yorkshire and Westmoreland.

The royalties are very extensive. Two seams of coal are in working—one upwards of 6 feet, and the other of 3 feet. The pits are at a moderate depth from the surface, and the coal is worked at an exceedingly cheap rate, and is much prized as a household coal, both for export and land-sale.

The entering tenant has the option of taking what stock he may require, at a valuation; and the amount of capital required to enter upon the collieries will be of very small amount.

For particulars apply to Thomas Whelton, Esq., Barnard Castle; or to Nicholas Wood, Esq., Newcastle-upon-Tyne.—Newcastle, March 3, 1848.

### IMPORTANT TO CAPITALISTS.—TO BE SOLD, an excellent SLATE and SLAB QUARRY—VARIEGATED MARBLE and HONE QUARRY—COPPER and LEAD MINES—all situated on the same property, within a short distance of the shipping harbour of Portmadoc, Carnarvonshire.

#### A GENERAL STATEMENT.

The above works are situated on a farm called Crossawr-uchaf, in the parish of Llanfrothen, in the county of Merioneth, about seven miles distant from the shipping harbour of Portmadoc, and about two and a half from the railway of the Festiniog slate Quarries to the port. They are near the celebrated quarries of Feinting, which are well known throughout Europe; and it hath been ascertained, by competent judges, that this slate vein is a continuation of the very productive vein worked by the Welsh slate Company at that place, of which Lord Palmerston and other noblemen are partners, which send about 500 tons per week of fine slate to the market. The vein is about 70 yards wide, and very advantageous for working, being situated on the brow of a hill, and the rubbish thrown down, where there is a depository of 200 or 300 yards deep for it, without causing any trespass. The quality is good, splits well, and is of a beautiful blue colour.—Slates of the largest size are made from it, and slabs also, of large dimensions. Thousands of fine slates, worked to sizes, and beautiful slabs, are now ready on the market.

The proprietor has ascertained most positively that no other slate quarries in Wales can produce such beautiful specimens from so near the surface, and where so little money can be expended.

The MARBLE and HONE adjoins the slate quarry, and some splendid specimens of variegated marble and hone have been already made from it.

The COPPER and LEAD MINES are about a quarter of a mile from the slate quarry, and the metals are of superior quality, and likely to become very productive.

There is the greatest facility for carrying on operations at all the works, which may be done with little expense, as few or no machinery will be required. A sawing and planing engine may be worked by water, just below the quarry.

Satisfactory reasons will be given why it is sold.

For further particulars, and to treat for the same, apply (postage paid) to Mr. Richard Jones, printer and auctioneer, Dolgellau, North Wales, where specimens of the slates, marble, hone, copper, and lead, may be seen.

Incorporated by Act of the Provincial Parliament.

The following directors have been named in the Act (together with other persons) as constituting the corporation; and they are to continue in office until superseded, or confirmed, by a vote of the London shareholders—viz.:

The Hon. W. A. BLACK,

The Hon. J. E. FAIRBANKS, Members of the Legislative Council.

The Hon. ALEX. KEITH,

J. W. JOHNSTON, Esq., Advocate-General.

This company has been formed for the purpose of WORKING a MINE, recently discovered, of IRON ORE of superior quality and richness, situated in the province of Nova Scotia, about 70 miles from Halifax, and about seven miles from a good shipping port, in the Bay of Fundy.

This extraordinary deposit of specular iron ore has been surveyed by Dr. Gesner and J. W. Dawson, Esq., provincial geologists. Extracts from their reports are appended to the prospectus, and other unquestionable references.

"To John Ross, Esq., of Tiverton, Nova Scotia.

"DEAR SIR.—It gives me great pleasure, in reply to your request, to express the high opinion I entertain of the talents, acquirements, sagacity, and high qualifications of Mr. J. W. Dawson, of Pictou, as a mineral surveyor and geologist, of which I had an opportunity of judging during an examination, which we made together, of several parts of Nova Scotia, and among others, the district of the Folley river—to the valuable ores of which you are now directing public attention.

I may further add, that Mr. Dawson's name is now well-known to the Geological Society of London by several Memoirs on the Geology of Nova Scotia, accompanied by maps and sections, published in their Proceedings and Quarterly Journal.

"I have further to add, that Mr. Dawson's name is now well-known to the Geological Society of London by several Memoirs on the Geology of Nova Scotia, accompanied by maps and sections, published in their Proceedings and Quarterly Journal.

"I have the honour to be, dear Sir, yours, &c.,

"11, Harley-street, May 2, 1848." (Signed) "CHARLES LYELL."

Application for shares will be received by Mr. Charles Walton, of the firm of Charles Walton and Sons, Newmarket's-court, 73, Cornhill.

## Transactions of Scientific Bodies.

## MEETINGS DURING THE ENSUING WEEK.

THIS DAY .....	Royal Botanic—Inner Circle, Regent's-park .....	3 P.M.
MONDAY .....	Geographical—8, Waterloo-place .....	8½ P.M.
	British Architects—16, Grosvenor-street .....	9 P.M.
TUESDAY .....	Medical and Chirurgical—53, Berners-street .....	8½ P.M.
	Civil Engineers—25, Great George-street .....	8 P.M.
	Zoological—11, Hanover-square .....	9 P.M.

## INSTITUTION OF MECHANICAL ENGINEERS (BIRMINGHAM).

A special general meeting of members was held on Tuesday, the 13th inst., in the Theatre of the Philosophical Institution of the above town.

J. E. M'CONNELL, vice-president, in absence of the president, presided.

Mr. KINTREA (the secretary) read the minutes of the previous meeting, which were confirmed; as also a letter from George Stephenson, Esq., the president of the institution, regretting his inability to attend, and requesting that his promised paper, "On the Fallacies of the Rotary Engines," might be postponed until the next meeting.

## ON THE BALANCING OF WHEELS.

By Mr. M'CONNELL, of the North-Western Railway.

Mr. M'CONNELL read the following interesting paper on the above subject:—The paper treated on the balancing of wheels as a very important matter, as most of the accidents, from carriages jumping off the line, had arisen from the want of balance in the wheels of the engine. The first who made this matter of practical observation was Mr. George Heaton, of Birmingham, on examining a lathe in the turning-rooms of Earl Craven, the wheel of which he found to be out of balance. This he remedied, and the lathe worked well again. Mr. M'CONNELL instanced several railway accidents of late, which had arisen from a want of proper balance in the wheels of the engine. He then proceeded to illustrate the usual method of balancing the wheels of locomotive engines, which he considered an improper one; and, on reference to experiments with another model, pointed out the desirability of obtaining an accurate balance in the piston and piston-rod.

In the course of the paper, Mr. M'Connell exhibited various experiments with a model railway carriage, explanatory and illustrative of the statements advanced in the above paper. The first experiment was made with wheels in balance, the motion to which was given by a spring, and the sustained regularity of the motion was unexceptionable. In the second experiment, a small piece of iron was inserted in the wheels, and the balance consequently destroyed—the natural tendency being to cause a jumping and jerking motion, to obviate which was the object sought in this contrivance. Similar experiments were made, to show the necessity of adopting a similar system of balancing the piston and piston-rods, in order to obviate this same jumping motion.—In explanation, Mr. M'CONNELL said, that the wheels could be properly balanced together. First, one wheel was balanced, and then they put the other wheel on upon the other side of the engine, and balanced it in the same manner. When the matter was first placed before Mr. Robert Stephenson, that gentleman considered it of no service, and it met with much opposition; but since that time Mr. Stephenson, and many other gentlemen, had adopted a plan of balancing their wheels, which, in his (Mr. M'Connell's) opinion, was not the correct one. When a locomotive engine was connected, and the driving-wheels and working part attached, it was lifted up at a certain speed without oscillating, and it became perfectly settled on its centres. That plan might answer tolerably well, but it was not the really true mode of balancing-wheels. He considered that great evil resulted from the piston and piston-rod not being in balance; it had been the cause of accidents in several cases where the engine did leave the rails when the wheels were in balance. If the engine attained a certain velocity—the piston-rod moving 1000 feet a minute—this momentum became so great, that the engine must jump; and the front wheels were, in some instances, clear of the road, and they could see between the wheel and the rail. They had an engine at Wolverton, fitted-up with those correcting weights, and it had been tried, for the first time, that morning on blocks. The engine, at a certain speed on the blocks, threw itself down, and they were not able to run it so fast as might be wished; but, on attaching the balance-weight, the motion of the engine was completely neutralized.

Mr. MIDDLETON said, that this appeared to be the system of balancing wheels, which had been introduced to the notice of the North-Western Railway, some years ago, by Mr. George Heaton, and against which hitherto there had been much prejudice. He felt convinced that it was one of the best methods ever suggested for securing the safety of the public, when travelling on railways, and a great many accidents might be obviated by the adoption of this, or some similar plan of balancing the wheels of engines and carriages. It was supposed that the North-Western line had disapproved of Mr. Heaton's plan, but he was happy to find that there was now some probability of Mr. Heaton reaping the reward of his industry by the use of his patent.

Mr. COWPER said, that a system of balancing-wheels was used by the Eastern Counties Company 11 years ago; but this was decidedly a superior plan to any he had ever witnessed, and in many respects superior to the plan he had seen of Mr. Heaton's.

Mr. M'CONNELL said, that Mr. Robert Stephenson had expressed his entire approval of the utility of this proposed mode of balancing wheels, and had already given orders for it to be attached to an engine he was now constructing.

On the motion of Mr. SMITH, seconded by Alterman THORSTON, the thanks of the institute were awarded to Mr. M'Connell for his communication, which was very generally approved.

## ON AN EXPRESS ENGINE.

By Mr. SAMUEL, Engineer of the Eastern Counties Railway.

The SECRETARY read the following paper on the above subject:—The small locomotive, lately introduced on the Eastern Counties Railway, having attracted some considerable attention, has induced me to present to your notice a short description of it; and, at the same time, to offer a few observations on the practicability of the principle to the conveyance of passengers. This carriage was constructed under my superintendence, for the purpose of conveying myself and inspectors on the lines of the Eastern Counties Railway, and thereby avoiding the great expense of special engines. The total length of the carriage is 12 ft. 6 in., and includes machinery, water-tank, and seats for seven passengers, on one frame, which is hung below the axles, and is carried on four wheels, of 3 ft. 4 inches in diameter, the floor being within nine inches of the level of the rails. It is propelled by two cylinders, 3½ in. in diameter, with a 6-inch stroke, placed on each side of the boiler, and acting on a crank axle. The boiler is cylindrical, placed vertically, and is 1 ft. 7 in. in diameter, by 4 ft. 3 in. in height; containing a fire-box, 16 in. in diameter, by 14 in. high; and 35 tubes, 3 ft. 6 in. long by 1½ in. diameter; giving 55 feet heating surface on the fire-box, and 38 feet on the tubes. The engine is fitted complete, with link motion, feed-pumps, &c. The water tank is placed under the seats, and will contain 40 gallons. This carriage is capable of conveying seven persons, at the rate of 80 miles an hour. It has, at times, attained a speed of 44 miles. The consumption of coke is only 24 lbs. per mile; and the weight of the whole machine does not exceed 25 cwt., including coke and water. The drawings which accompany this description, will be found sufficiently explanatory of all the details of the machine. The result of observations, which I have for a considerable time been making, on the "Branch Passenger Traffic of Railways," has been to convince me that, on the whole, it is not remunerative, and, in some cases, is even worked at a loss. I have been, therefore, led to consider whether the expenses might not be reduced, by the introduction of a system of steam-carriages more suitable to the amount of traffic to be conveyed. It is evident, that the more we can reduce the dead weight of the trains and engines, in proportion to the number of passengers, the less will be the expense of repairs, both of the carrying stock and engines, and of the way and works of the line. The average weight of a train, on the branch lines of the leading railways, is 56 tons; the number of passengers, conveyed by each train, not exceeding 35 to 40 on many of the branch railways in England. Supposing each passenger, with luggage, to weigh 1½ cwt., the total weight of passengers conveyed is about 3 tons; or, in other words, for every ton of paying load we are now carried by the present system of locomotion, we have 18 to 20 tons of dead weight. It is, therefore, in a commercial point of view, of the greatest importance, not only to railway companies, but to the public generally, that some less expensive, and, at the same time, equally safe, means of transit be adopted. It is, therefore, proposed to substitute steam-carriages for locomotives on branch railways, similar in construction to the drawings herewith produced. These drawings represent a patent steam-carriage, now in course of construction, under my direction, by Mr. W. B. Adams, the patentee, for the Eastern Counties Railway Company. The following are a few of the principal dimensions:—Diameter of cylinders, 7 in.; length of stroke, 12 in.; diameter of driving wheels 5 ft.; distance between centres, 20 ft.; width of framing, 8 ft. 6 in. The boiler is of the ordinary locomotive construction; 5 ft. long, by 2 ft. 6 in. in diameter. The fire-box is 2 ft. 10 in. by 2 ft. 6 in. There are to be 115 tubes, of 1½ in. in diameter, and 5 ft. 3 in. in length, giving 210 feet of heating surface in the tubes. The area of the fire-box is 25 square feet, giving a total of 235 feet of heating surface on the boiler. The consumption of coke I have estimated at 7 lbs. per mile, at a velocity of 40 miles per hour. The total weight of the steam-carriage, with its coke and water, will not exceed 10 tons, and it will be capable of conveying about 42 passengers, at a speed of 40 miles per hour. The water is to be carried below the floor of the carriage, in wrought-iron tubes, of 12 in. diameter, and 12 ft. long. One great object attained in this machine, is the reduction of the centre of gravity, and the consequent absence of lateral oscillation. This carriage is intended for the Enfield and Edmonton branch of the Eastern Counties Railway, and is expected to be at work in about three months from this date. When its practical utility and economy has been proved, I

shall be glad to submit the result to the institution at a future meeting; as I feel convinced that the subject is one deserving the attention of the members, and of all parties interested in the profitable working of railways. I may also add, that were the system of light steam-carriages adopted, branch railways might be constructed at a very small cost indeed, compared with the present outlay (which is unavoidable so long as the present system of heavy engines is continued); and the advantages of railway accommodation might be extended to those districts, which can never hope to enjoy them, if the construction of railways continue to require such large outlays of capital.

Mr. M'CONNELL also read a communication on the same subject which had been addressed to him, to the following effect:—He had declined giving any opinion, wishing to take the sense of the institute upon the merits of the engine in question.

Mr. SAMUEL considered that his engine would save a considerable sum in the wear and tear of the rails, if not in coke, in consequence of the great reduction in the weight of the engine. He estimated the tear and wear of rails at 80t. per annum, independent of the loss in the tires of driving-wheels, which was a large source of outlay. He suggested the running of a number of small trains on a light description of rails, which would reduce the cost of branch railways, and, at the same time, be adequate to all the local traffic.

A MEMBER inquired, how the projector would be enabled to convey heavy castings upon such a line?—Mr. SAMUEL said, that might be obviated by distributing the weight over several trucks, as was sometimes found necessary upon the lines now in use; and, in case of holiday excursions, he proposed running a number of these small trains, instead of the present heavy ones.

Mr. M'CONNELL said, that he presumed it would be desirable to have the rails sufficiently heavy to allow an ordinary locomotive to travel over them, in case additional carriages had to be taken on at certain points of the line, for extra traffic arising from holidays, races, &c.—Mr. SAMUEL said, it would be desirable that such should be the case, where it could be done. It was proposed to construct these rails on longitudinal bearings of timber—therefore, a comparatively heavy engine might traverse it without danger. In reply to further questions, Mr. Samuel said, that the pressure usually used in this engine was 120 lbs.; but it was not proposed to work those branch engines at a pressure of more than 80 lbs.

Mr. M'CONNELL and Mr. COWPER considered this engine peculiarly calculated to be worked with economy on the branch lines, as it would tend very much to make them pay, by economising the locomotive expenditure.

Mr. BUCKLE inquired, how the distance of the wheels would suit the present turn-tables?—Mr. SAMUEL said, it was usual, at every terminus, to have a large turn-table, suited for engine and tender; and, where there was not such a contrivance, they could make a triangle, which would be as good. The increased speed obtained on these trains would obviate the necessity of frequent changes of carriages; and he estimated the average cost of conveying the passengers would not exceed one-fifth of a penny per mile. Many of the branch lines did not pay, and some economising principle was needed to effect that object. In answer to further questions Mr. Samuel said that he proposed to work the goods traffic in a similar manner.

Mr. M'CONNELL still thought that the rails should be equal, on these branch lines, to bear the ordinary engines now in use on the main lines, in case they went over them; the wear and tear would also be less upon strong rails.

Mr. COWPER considered the ordinary rails in use were much too light, and, at the present price of iron, he thought it bad policy to lay down a light rail.

The meeting expressed their entire approval of the engine for all the purposes of the ordinary branch lines of railway, and passed a vote of thanks to Mr. Samuel for his paper.

## CRADDOCK'S PATENT CONDENSING ENGINE.

In answer to inquiries, made at the last meeting, Mr. CRADDOCK read the following paper:—At our last meeting, several questions were put to me by gentlemen then present—some of which I was not at the moment prepared to answer; and, as to one of those questions, I am not yet prepared with so conclusive an answer as would be satisfactory to myself or the meeting—I allude to the question put by Mr. M'Connell, as to the relative economy of my boilers in the generation of steam, when compared with the common boiler. It was my intention, had the further discussion of this matter been deferred till the regular quarterly meeting, to have been prepared with experimental and conclusive results upon that point. Before referring to other questions raised at that meeting, I will offer a few observations on the advantages of two-cylinders, when used for expanding steam, as I propose, from a very high to a very low pressure. Mr. Crampton alluded to the loss shown by the curve of the indicator figure. Not more sensible of this loss can Mr. Crampton, or any one else, be than myself, as I have long ago publicly assigned that as the reason which induced me to design and construct engines on the principles of the one now before the meeting, and which, I think, on investigation, will be found calculated to effect the object. But I wish to remind the meeting, that the indicator will not detect the loss alluded to by me, as that arising from the steam being condensed by the comparatively cold metal of the cylinder—the water resulting from such condensed steam being in contact with the thus heated metal—which water, when placed in communication with the condenser, re-absorbs the heat; thus rendering such heat and water inert, when we require it active, and active when we require it condensed. But to pass by all this: I think the validity of Mr. Crampton's assertion is open to question—viz.: that the fly-wheel will meet all the objections without the two-cylinder engine—whilst the irregularities, and other difficulties, attending the one-cylinder system, are not considerable, the fly-wheel does not meet such difficulties; but the matter is very different when, as in my case, we avail ourselves of the expansive principle to the fullest extent; and to render such safe and practicable was the primary motive which led to these arrangements. To illustrate the matter, let us suppose it desirable to use steam at 200 lbs. per square inch—such steam being reduced by expansion, before it quits the cylinder, to 3 lbs. per square inch—which would require the steam being cut off at about 1-64th of the stroke; to do which in one cylinder, such cylinder must be of large capacity—and hence we have 200 lbs. on the square inch acting upon an extensive piston-area at the commencement of the stroke; and, at its termination, only 3 lbs. per square inch. It must be very obvious, that this would produce immense strain upon all the working parts of the engine—to meet which difficulties they would require to be inconveniently heavy and strong; besides, what weight of fly-wheel would be required to equalise such a motion? Yet, with an engine on similar principles to the one before the meeting, all these difficulties are met by a reduction of weight and bulk of engine; the strain also upon the various working parts is kept quite as low as in the low-pressure engine. I think if gentlemen will bear in mind these reasons, and others which will readily suggest themselves to their own minds, many of them will agree with me, that there are strong and valid grounds for concluding, that the double-cylinder engine does possess advantages for carrying out the expansive principle as I propose it, which advantages are supported by the soundest theory, and are confirmed by practice. In replying to other questions, I shall endeavour to be brief; my replies being as follows:—That, in large boilers (such as those exhibited in the drawings before the meeting), for marine and locomotive purposes, the extent of surface on which the heat generated in the furnace acts is 30 square feet for every 62 lbs. of steam required to be generated per hour—three-fourths of such surface is exposed to the radiant heat, and one-fourth to the communicative heat. The extent of surface required in the condenser to condense 62 lbs. of steam per hour is 70 square feet, when air is the medium of condensation. With water, as the medium of condensation, 16 square feet of surface is sufficient for the condensation of 62 lbs. of steam per hour. With air, as the medium of condensation, 62 lbs. of steam, generated under a pressure of 100 lbs., will, with such engines, produce at least 8-horse power; and with water, as the medium of condensation, 4-horse power is easily obtainable from 62 lbs. of steam per hour.

From the above, it follows that the surface necessary in the condenser, per horse power, is the one-third of 70 square feet, or 23½ ft.; whilst with water as the medium of condensation, the surface required in the condenser will be one-fourth of 16, or 4 square feet per horse-power. In reference to weight of boiler, condenser, and engine, I am prepared to state, that the boiler, with casing, grate, steam-chest, all complete, does not exceed 1 cwt. per horse-power; the condenser, when air is the medium of condensation, does not exceed ¾ cwt. per horse-power; with water as the medium of condensation, the condenser would not exceed 40 lbs. per horse-power. The coal required, with air as the medium of condensation, is 3 lbs. per horse-power per hour; and with water as the medium of condensation, it would be even less than 3 lbs. Again, we find the weight of boiler, condenser, and engine, even with air as the medium of condensation, not to exceed 2½ cwt. per horse-power. If we contrast this weight with that of the *Banshee* engines, lately introduced into one of the Government vessels, and which is a fair instance of the weight of the present make of engines, we find the *Banshee* engines and boilers (with water) weigh 280 tons for 350-horse power. The weight of engine, boiler, and condenser, on the principle of the one before the meeting, equal to 350-horse power, would not exceed 60 tons, which is not one-fourth that of those of the *Banshee*; whilst I do know that the consumption of fuel would be reduced nearer two-thirds than one-half of that necessary in the instance given. Much was said at the last meeting about a comparison in actual work; since then I have been informed by Mr. Humphries, of Pershore (the only person who has yet thought my invention worthy of adoption), that with an engine of our manufacture, which is far from being so perfect as experience would now enable me to make it, he thrashed 50 bags of "gandy" cut wheat with 3 cwt. of coal; and that a neighbour of his, with another engine, thrashed 30 bags of wheat with 30 cwt. of coal; the coals were of the same quality in both cases.

After reading the paper, Mr. CRADDOCK, at the request of Mr. Clift, explained the construction and operation of a small boiler, engine, and condenser, which was placed before the meeting; at the conclusion of which he said, that owing to the scepticism which seemed to pervade the minds of some members, as to the economy derivable from the use of such engines, &c., he would make a proposition; and he did so in no invidious spirit, or as an invidious contrast, but with a view of showing such members, that the economy he ascribed to the en-

gine was really derivable from it—which proposition was, that he would, with an engine of the above principles, drag backwards an engine of the low-pressure kind, working with steam at 20 lbs. pressure, including the atmosphere; this he would do with a consumption of half the fuel which the low-pressure engine was consuming.

Mr. M'CONNELL here again repeated his former question, respecting a comparative trial with the engines at the London Works.

Mr. CRADDOCK met the question by the same reply as at the former meeting.

Mr. COWPER answered Mr. M'Connell by saying, that during the time Mr. Craddock's engine was at the London Works he was excessively busy, and that Mr. Craddock had no control over their engines.

It was asked by a member, why the engine was placed at the London Works?

Mr. CRADDOCK replied, that it was placed there (in the early part of 1844) for the purpose of removing the scepticism which then existed as to the steam being condensed by the atmosphere. Some even asserted, that he, in some secret manner, used water for the purpose of condensation.

Mr. M'CONNELL said, that he did not think that the meeting was prepared for want of sufficient data, to give an opinion upon the merits of the invention.

Mr. CRADDOCK replied, that he had stated the comparative economy to be 50 per cent.; he had also made what may be deemed an indiscreet challenge, as to a test of such economy, when compared with the low-pressure engine; and had referred to the detracting representations made to the Messrs. Humphries, alluded to in his paper, which had quite determined them at one time to annul the contract for the engine, which he said he had given them to understand they might do, if they had lost all confidence in him, that the engine would not answer his representations.

Mr. M'CONNELL said, that these parties afterwards determined to have the engine; and, perhaps, the best proof he could possibly give, as to the evidence of its working, was, that the Messrs. Humphries, after having had the engine at work for 12 months, desired him to construct for them another engine on similar principles, which will cost 5000l.

Mr. M'CONNELL said, he thought the meeting had better defer giving an opinion, and he had no doubt but Mr. Craddock would bring the matter before them again.

Mr. CRADDOCK said, that if there were not already sufficient evidence before the meeting to warrant them in giving some opinion, he should despair of ever producing sufficient evidence for that purpose, and must decline bringing the matter again before them. He further said, that the invention was composed of various parts, and pointed to the engine as one of those parts, which, it did seem to him, the meeting might determine upon—whether it possessed merit or demerit.

Mr. M'CONNELL then proposed that, if Mr. Craddock would fix a time, three or four members should make experiments upon the engine, and the meeting would then give an opinion upon it.

Mr. CRADDOCK said, that he would render every facility in his power, but must insist upon one condition—viz.: that the data, or elements, brought out by the experiments upon which the opinion was formed, should be appended to the opinion.

Mr. M'CONNELL said, if Mr. Craddock would appoint a time with the secretary (Mr. Kintrea) for making the experiment, a committee would investigate the matter.

Mr. CRADDOCK said, if they would show a disposition to use him fairly, they should find him honest, and

## INSTITUTION OF CIVIL ENGINEERS.

JUNE 20.—JOSHUA FIELD, Esq. (President), in the chair.

The paper read was "On Harbours of Refuge," by the Right Hon. the Earl of Lovelace.—It consisted chiefly in a succinct review of the Reports of the Commissioners on Shipwrecks and on Harbours of Refuge; giving the opinions of the naval officers and civil engineers on the necessity for harbours, in certain situations, and the naval qualities possessed by those positions—the possibility of constructing harbours in them, and the nature of the structures. The necessity for harbours on our coasts, capable of sheltering fleets from storms in peace, and the enemy during war, appeared to be admitted, particularly at the present moment, when the disturbed state of the continent and the restless character of our near neighbours were considered. It was stated, that, of various situations pointed out, that of Dover was the only one yet decided upon, although great works are contemplated at Portland, where, from Mr. Rendle's designs, a system of construction would be adopted, which would be both economical and stable, and at the same time would afford employment to a class of persons whose labour it had been difficult hitherto to use efficiently. The various projects of floating breakwaters, and other artificial shelter for vessels, were then examined, and were generally condemned, as entirely inefficient for the objects proposed.

The questions relative to the movement of sand, the drifting of the silt, and the deposit of silt in Dover Bay, and other places, were treated at great length, and reasons given for the various forms of construction, and of the projects for meeting the difficulties induced by these circumstances.

The next question was the place of the harbour, and the mode of construction of the works. After quoting all the authorities on both sides, including the naval officers, the commissioners, the civil engineers, and the scientific writers, the preference was given to a large harbour, with two entrances, so placed as to allow a sufficient run of the tide through it, to prevent any very considerable deposit of silt, but so constructed as to afford shelter to the vessels within. The pier walls inclosing the harbour to be built vertically up from the bottom, or with a very slight inclination in their height, instead of throwing in masses of rubble stone, to find its own angle of repose, which, it was shown, was not less than four or five to one, and that it only attained solidity after a lapse of many years, even with a due admixture of small materials to fill up the interstices, and after constant supplies of stone, to replace that which the sea has removed. The reports of Capt. Washington were quoted, to prove the failures that had occurred at certain harbours in Ireland, where it was stated that the long slopes had been destroyed by the sea, and had ruined the harbours they were intended to protect. The proceedings at Cherbourg and Plymouth were followed in great detail, with a view to deducing arguments against the long slopes, and in favour of vertical sea walls.

The protest, by Sir Howard Douglas, in favour of long slopes, was examined at great length, and the arguments used on both sides were analysed with skill and candour.

Colonel Emry's theory of the effects of the "Roat du fond," was carefully examined; and, without going to the entire length that he did, it was admitted, in many cases, the effects produced were as he described them, and that the subject, as he had brought it forward, was well worthy the attention of civil engineers.

The placing a vertical wall upon a substratum of rubble, in the form of a long slope, was shown to be pregnant with mischief, and had never been successful; and that of the adoption of that system at Cherbourg had been a matter of necessity rather than of choice.

Mr. Alian Stephenson's clever experiments, on the force of waves striking opposing bodies, were given; and it was urged, that the force shown to be developed by a breaking wave could not act upon a vertical wall, up and down which it would merely oscillate; whereas it might fall with all its accumulated force upon a slope, upon which it would naturally break. In conclusion, it was urged, that, although for Dover, which was the spot whereon to mount guard over the channel, in order not only to prevent invasion, but to maintain our naval supremacy, it might be permitted to expend a large sum of money; yet it would not do to have several Dovers; and, therefore, it behoved the authorities to consider carefully the site, the plan, and the method of construction before commencing works in which, in the present state of engineering science, the experience of the past should be used to avoid the errors that had occurred in former and similar works.

In the discussion which ensued, and in which the principal civil engineers engaged on great hydraulic works took part, after justly complimenting the Earl of Lovelace, for the very able and impartial analysis he had made of the evidence contained in the Government reports, and the documents in his possession, the speakers explained most satisfactorily the actual circumstances and conditions of the works which had been instanced as failures; and it was shown, that far from being expensive or useless works, they had been completed within the original estimates; and that wherever the construction had required restoration, or addition, it had arisen from the use of defective materials, which, being on the spot, it had been obligatory to employ, and not from the use of the long slope, which, as compared to vertical walls in similar situations, was shown to be more durable, and to have been, in many instances, successfully substituted for vertical walls, after they had succumbed to the assaults of the raging billows. The discussion was stopped prematurely, by the adjournment of the meeting at the usual hour, but was announced for renewal next Tuesday evening, June 27th, the last meeting of the session, when the following papers would be read:—"On Ventilating Water Wheels," by Mr. W. Fairbairn, Mem. Inst. C.E.; and "On the Strength of Iron Girders for Bridges," by Mr. Homersham Cox; and the monthly ballot for members would take place.

## THE COPPER ORE DUTIES.

TO THE EDITOR OF THE CORNWALL ROYAL GAZETTE.

Sir,—Considering the reckless manner in which the free-trade mania has been carried out, your readers will hardly be surprised to read the following most consistent statement upon this particular question:—consistent, I mean, with the other proceedings of Government upon the matter.

Information, of an authentic kind, having been received, that, upon the merely preliminary proceedings which took place upon this question in the House of Commons, in April last, the Ministry had authorised the admission of foreign copper ores for consumption, at the duty of £ per ton, as proposed by them in the measure now pending before the House of Commons—taking an engagement from the importers to pay the difference, in case the bill brought in for the reduction of duties did not become law—an inquiry was instituted in the House, from the President of the Board of Trade, the head of that department, where the matter might fairly be presumed to be perfectly understood; the answer to which was, that it had been so admitted. A further inquiry was then made, whether proper precautions had been taken to ascertain the produce or richness of the ores so admitted, with a view to the collection of the remaining portion of the duty, in case of need, according to the graduated scale, proportioned to the quantity of metallic copper contained in the ore, as fixed by law; and what was the answer? That the authority so questioned, did not know whether or not that had been done—but he rather thought it had not. Further inquiry was instituted among the working subordinates of the department, with the result of a corresponding profession of ignorance as to so important a fact.

The consequence of such an extraordinary state of things was, that a motion was put upon the notice book of the House of Commons for, amongst other things, "An account of the total quantities of foreign copper ore which have paid duty in the United Kingdom, from the 17th April to the 5th June, 1848—specifying the rate, or rates, of duty paid upon the same, and the total amount of such duty; and distinguishing the quantities on which duty has been so paid, that may have been imported from Cuba, Chili, and Australia, or other British settlements respectively, from that imported from all other parts;—and further stating, if an account has been taken at the several custom-houses where the same may have been entered, of the per centage of metallic copper contained in the ore upon which duty may have been so paid (except upon that imported from Australia, or other British settlements), with reference to the discriminating rates of duty payable upon the same under the existing law; also stating the names of the parties who have so entered the said ores for duty, and the quantities severally entered by each such party; and whether the same has been entered after giving regular bonds for the payment of the balance of duties, if required, with the names of the respective sureties; or if the entries have been made without such regular bonds being taken; and if so, stating upon what other kind of engagement the said ores have been admitted to entry."

The information thus asked for must now be satisfactorily supplied; and if, as is most probable, the facts should establish the correctness of the surmises of the inquiring parties, it may well be asked, whether such an extraordinary assumption of the powers of Parliament—such an absolute usurpation of the functions of Queen, Lords, and Commons, is to be tolerated, on the part of men, the official paid servants of the public—men who ought, in the discharge of their official duties, to stand and act impartially between all classes of their fellow-subjects, instead of being, as they are, the avowed partisans of a system which has already seriously injured many of the interests of the country, and menaces some with absolute ruin—it may, I say, be asked whether such an encroachment upon the authority of the Legislature, and upon public rights—such a tampering with many thousand pounds of our revenue—and so gross a general dereliction of duty, are to be permitted?

The monthly returns of trade and navigation for the present year, put forward by the authorities with so much zeal, and furnished with a promptitude so unlike that practised when returns are asked for by members upon important subjects, which may present a chance of being at all inimical to the one-sided views of those authorities—those monthly returns to the 5th April and 5th May respectively, show a singular state of things, not unworthy of notice. I will take the accounts of the past and present years for some points of comparison:—

The quantity of copper ore which was imported in the three months, ending 5th April, 1848, was ..... 12235

In the corresponding three months of 1847 ..... 6814

Increase in 1848, above 1847 ..... 5421

The quantity imported in the four months ending 5th May, 1848, was ..... 15111

In the corresponding four months of 1847 ..... 8959

Increase in 1848, above 1847 ..... 6152

The quantity charged with duty for home consumption, in the three months ending 5th April, 1848, was ..... 6638

In the corresponding three months of 1847 ..... 7130

Decrease in 1848, below 1847 ..... 492

The quantity charged with duty, in the four months ending 5th May, 1848, was ..... 11995

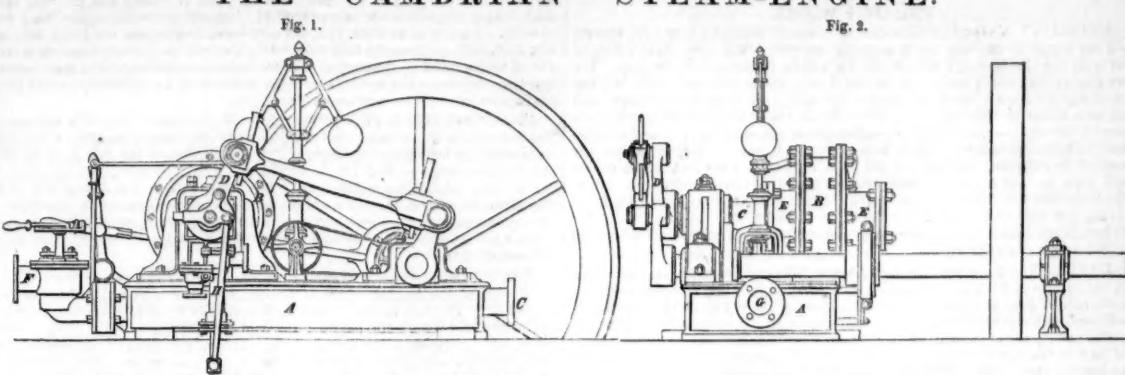
In the corresponding four months of 1847 ..... 9231

Increase in 1848, above 1847 ..... Tons 2764

When the next monthly return makes its appearance, for the five months ending 5th June, I expect to see that a larger quantity has paid duty than the whole import of the period. In the meantime, it may not be amiss to notice the fact, that, in both the three months and four months of 1847, the quantity which paid duty exceeded the import for each of those terms. But, in both the first three months and four months of the present year, the quantity which paid duty was between 5000 and 6000 tons less than the import; those large quantities being reserved to avail of the unconstitutional and illegal practise of the Government, with respect to duties, herein stated in that respect, and which had only been in operation about a fortnight on the 5th of May.

Might I not go further, and surmise that, as the import of the first four months of the present year is 68 per cent. more than last year—approaching nearly to the maximum quantity of any former period—with the probability that the remaining months of the year will run up the whole quantity to an amount exceeding any thing that we have before known; would it be unfair to surmise, that, in the course of the autumn of last year, some intimation was given to Lord John Russell's pet sufferers, the smelters, and their friends the importers, of the intention of bringing in some measure for the removal of the duty; else why, after the bitter complaints (poor things!) of the stagnation of their trade last year, should there happen to be so sudden and large an increase this year? Such reflections as these will force themselves upon the mind; and it may be well, as I intend, to watch the progress of the question generally.—*PUBLISHER: London, June 10.*

## THE "CAMBRIAN" STEAM-ENGINE.



## BORING BY STEAM-POWER.

In accordance with the promise made by Messrs. Mather, of the Salford Iron-Works, we have received an elaborate description of their patented boring apparatus, with a series of descriptive diagrams, which are however, too numerous to insert as wood-cuts; and we shall, therefore, endeavour, to the best of our ability, to give a general description, which, we trust, will convey to our readers a clear idea of the machinery employed.

A steam-boiler is placed, in any convenient situation, near the spot where the hole is to be bored, and is connected with a cylinder and piston, in the usual manner, working a crank-shaft and lifting-cam, and also a large pulley, driving the gearing for winding up the materials. The boring head is attached to a lever, working on a fulcrum, to the opposite end of which is placed counterbalance weights, and is also in connection with an air-cylinder and piston, to act as an elastic buffer, or spring, in order partially to break the fall of the borer head, after being lifted by the lever and tappit. The flat hempen rope, to which the borer is hung, is wound round a large drum, to any necessary length, connected by fast and loose pulleys to the crank shaft, and furnished with a break, acted on by a lever, to be worked by the foot. On the engine being set to work, the shaft, on which is fixed the lifting-cam, at every revolution raises the lever and boring head once, and which again falls by its own gravity. A section of the borer represents a block, with eight arms, in each of which are, strongly bolted and screwed up, two powerful steel cutters—thus forming two circles, one within the other, of 8 cutters in each, or 16 in all—the outer ones projecting, to keep the hole always larger than the head, so that it may fall free. Above this is a box on the boring head, or rather it is formed hollow at this part, and turns on a swivel; in it there is a ratchet-wheel, acted on by two catches, and so arranged, that when the cutter block has struck the bottom of the hole, the swivel descends by its own gravity, and is thus caused to turn by an incline key, or feather—thereby giving a twist to the rope, or belt; and, on its raising, the boring head, which is 20 cwt., gives out the twist put in by the descent of the swivel, and thus compels the head to be turned at every stroke  $\frac{1}{10}$ th of a revolution, and so changing the position of the cutters at every blow struck—thus securing a perfectly true cylindrical hole, and the sinking perpendicular. When a sufficient quantity of pulverised matter has accumulated in the bore-hole, the drum is put into gear, the boring head brought to surface, and apparatus for bringing up the materials lowered. This consists of a long cylinder, in which is fitted easily a bucket, or piston, with clack-valves, opening upwards, and cottered fast on to the end of a rod; this is lowered to the bottom; and, still continuing to lower the rope to which it is attached, the piston descends in the cylinder; then, commencing to hoist quickly, raises the piston—thus forming a vacuum. The pulverised materials (stones, or pieces of cutters, of 2 or 3 lbs. weight) are drawn into the cylinder. The operation of raising and lowering the piston is by the winding motion, and is repeated for a few strokes, until the cylinder becomes full, when it is wound up to the surface. A cotter is knocked out, which liberates the bottom, or clack-piece; the cylinder is then raised by the winding motion, the materials, &c., fall out into the wagon; it is then re-cottered, and the process repeated, until all the borings are removed, when the boring head is again brought into use.

Another part of the apparatus consists of an arrangement of projecting cutters, for widening a bore-hole to any extent of diameter, and a receiver, which is placed at the bottom, to collect the materials as they fall. The patentees claim—firstly, the combination and arrangement of the machinery described, or any modification of the same, sufficient for the purposes there set forth; secondly, the construction and application of the several parts, as shown and described, being the boring head, and, most particularly, its motion for turning the cutter block at or near the bottom, by whatever mode or machinery the same may be effected; thirdly, the application of the apparatus for raising the materials; and, lastly, this apparatus, as being applicable to boring generally, whether by this plan, or by the ordinary method of boring.

**EAST LANCASHIRE RAILWAY—OPENING OF THE BLACKBURN AND ACCRINGTON SECTION.**—On Saturday last, that portion of the East Lancashire Railway which connects Accrington with Blackburn, was inspected by Capt. Wynn, who was accompanied over the line by Mr. T. Dugdale, Mr. R. Hacking, and Mr. Perring. The inspector expressed himself as perfectly satisfied with the works, and arrangements were made in consequence for the opening of this portion of the line on Monday. The day proved a very auspicious one, and a great influx of passengers resorted to the different stations on the line. Several of the trains were well filled, and the day passed off without accident. The trips to Accrington were generally accomplished in about 15 min., including the stoppages at the Rishton and Church stations; and the trains returned to Blackburn in from 10 to 12 min. The line through Ormskirk to Liverpool is expected to be opened in the course of October, when the distance from Blackburn to the latter place will be run in about an hour.

**AN EPISODE OF THE RAILWAY MANIA.**—Mr. George Pilkington, the late engineer to the Central Spain Railway Company, appeared at the Insolvent Debtors' Court, on the 19th inst., to obtain relief from his liabilities, where he was opposed by Mr. Nicols, and supported by Mr. Cooke.—In reply to questions from the opposing counsel, the insolvent denied that he had ever received so much as 20,000£. from the Central Spain Railway. The whole amount he had received was, as stated in his schedule, 9350£.—Mr. E. H. Lindo was then called, and stated that he had unfortunately been a shareholder in the Central Spain Railway, and formed one of the committee appointed to investigate the affairs of the concern, which the body of the shareholders considered to have been badly conducted. He had made a copy of the company's cash-book, which showed that insolvent had been paid 12,900£. in cash, and 8000£. in shares—that was to say, 4000 shares were given to him, on which the company paid the original deposit of 2£. a share.—The insolvent said, he had never received all the sums entered in the cash-book; and as for the shares, he had sold them at prices varying from 5s. to 15s. a share.—The Court considered that the balance sheet must be amended, and adjourned the case for that purpose.

**PHOTOGRAPHIC PORTRAITS.**—The improvements which have recently been effected under the scientific direction of Mr. Beard are so great, that although the principle of the process remains the same, the best specimens formerly produced were but meagre, indistinct, sombre, and shadowy outlines, compared with the pleasing, minutely beautiful, and really life-like portraits which are now being exhibited at the galleries in King William-street, City, and Bridge-street, Westminster. The beauty of the photographic picture depends mainly on the degree to which the metallic plate can be rendered sensitive to the action of light; and it is in this part of the process that the principal improvements have been effected. A change has been made in some of the chemicals used, and a complete alteration in the mode of applying them. The effect has been a greatly increased brilliancy of tone and colour; white is now produced without the admixture of blue, which formerly prevailed; light and shade are perfect; the flesh tints clear, warm, and natural, and the entire colouring, which is now embodied as it were on the plate, can only be compared to the finest enamel. In consequence of the additional susceptibility of the plate, the process has also been shortened, the results being now not only more perfect, but more certain than heretofore. The specimens we have seen in King William-street are very beautiful. The busts and figures stand out from the background in bold, distinct, and massive outline, and the texture of every portion of the dress, whether of silk, velvet, satin, or woollen cloth, is rendered with a richness and delicacy which constitute these improvements a perfect triumph of art.—*Times.*

**THAMES TUNNEL COMPANY.**—The number of passengers who passed through the Tunnel in the week ending June 17, was 18,782; amount of money, £78 5s. 2d.

## Mining Correspondence.

## ENGLISH MINES.

**ANTIMONY AND SILVER-LEAD.**—Capt. C. Williams (June 20) reports—I am happy to say our work is going on well. We have about 2 fms. to drive on the Marlborough adit to cut No. 1 lode, as marked on the map. We are also driving north and south on our newly discovered lead lode. In the south end we have a fine lode, about a foot solid; we have driven 2 fms., and are now about to sink upon it. The lode in the north end has rather improved this week—carrying some good stones of ore, mundic, spar, and blends; but the lode, as I last wrote you, being split up, not yet come together, nor could it be expected, as there has not been more than a few feet driven in this end since my last report, the men being engaged in other work. The end in the Grenville adit has somewhat improved this week, having got through the caving, but still very tight; we have got about 40 fms. to drive to cut the Wheal Sarah lode. We are preparing our ore for market, and shall send it off in the course of next week.

**BARRISTOWNE.**—Capt. Thomas Angove (June 15) reports.—In the winze, in the bottom of the adit level, the lode is about 2 ft. wide, composed of lead, carbonate of iron, and gossan, producing about 1 ton per fm. The lode in the adit end, east of Nangle's shaft, is greatly improved; it is about 3 ft. wide, composed principally of gossan, with a mixture of lead through it, and a solid branch of lead on the north wall, about 4 in. wide. The pitches look much the same as last reported, except in the old mine, which are gradually falling off in quantity. Nothing new in either of the cross-cuts since my last; although driving south from eastern flat-roof shaft, we expect to cut the lode in short. We expect to get away a small cargo of lead by Saturday or Monday next.

**BEDFORD UNITED.**—Capt. T. Ellery (June 21) reports.—At Wheal Marquis, the lode in the 90 fm. level east is still 2½ ft. wide, and will produce about 3 tons of ore per fm.; there is no alteration in this level west in the past week; the stopes, in the back of this level, are worth 30/- per fm. The lode in Hodges' rise, in this level, is 3 ft. wide—good saving work. The lode in the 80 fm. level east is 2 ft. wide, producing good stones of ore, altogether more promising than for some weeks past. In Evans' winze, in the 70 fm. level, the lode is 3 ft. wide, producing good saving work.

**CALLINGTON.**—Capt. J. T. Phillips (June 19) reports.—In the north engine-shaft the ground is a little more favourable for sinking. In the 100 fm. level south no alteration has taken place. In the 90 fathoms level south no lode has been taken down; in the 90 east the ground is favourable for driving; from the appearance of the ground we expect the cross-course is near at hand. In the 70 east we are driving on a south branch; it is small and kindly, composed of spar, fluor-spar, and copper ore; in the winze, below this level, we have good stones of copper ore; in the stopes the lode will produce 5 tons of ore per fm. In the 60 east the lode is still disordered by cross-courses, producing copper ore. In Kelly Bray engine-shaft the ground is improved since last report. At the south mine, in the 125 fm. level north, the lode is 6 in. wide, composed of fluor-spar, intermixed with silver-lead ore. In the 112 fm. level north and south the lode is producing silver-lead ore. In the 100 and 90 fm. levels north we are opening ground that will work at a moderate tribute.

**CARWINNING HILL.**—Capt. Henry Francis (June 19) reports.—Our deep winze is now communicated to the shaft; the depth of the winze on the lode is 17 fathoms, and the depth of the perpendicular shaft 10 fathoms; the winze holed in the eastern level 6 ft. from the shaft. The 10 fm. level, west of the perpendicular shaft, is worth about 40/- per fm. The 10 fm. level east has reached the cross-lode, and we have to drive south upon it, from 8 to 10 ft., to reach the main lode, should the heave be the same as in the adit level. No. 2 winze 10 fms. deep, and worth about 40/- per fm. The deep adit level, west from No. 1 winze, is yielding a little ore; the lode in this level is gradually improving. The deep adit level north, on the cross-lode, still continues unproductive. The stopes on the junction of the lodes, over and under the adit level, are producing good gossan ore. In a fortnight from this time we shall have dressed about 40 tons of grey ore, and about 20 tons of gossan ore; and as our dressing-floor is small, it will be desirable to have that quantity sent to market. —Mr. Theophilus Paton, jun. (June 17) reports.—The cost in future will be about 200/- per month; for this ore will be returned, at least 80 tons, worth 10/- per ton: I wish to be within the mark. This will leave a handsome profit, and effectually console the shareholders for all outlay. Capt. Francis will have given you all particulars regarding the mine before this reaches you. I will write to you on Monday or Tuesday, in order to give you further intelligence.

**COATLITHE HILLS.**—Captain J. M. Paull (June 17) reports.—Since my last we have sunk to the bottom of the hazel bed, but have found no material alteration in the vein; I have put the men to drive westward; and in a short time, if the vein be found productive, I shall recommend a deeper level being brought in from the side of the hill, as it is most disadvantageously situated for working, and which would be requisite, in order to open out the mine effectively.

**CONDURROW.**—Capt. N. Vivian (June 18) reports.—The engine-shaft is 8 fms. below the 60 fm. level; the lode therein is large and promising, but poor. In the 60 west is a good course of tin; in the 60 east the south part of the lode is large and promising, and it has drained the water from the 50 fathom level, which 27 fms. beyond it; the north part, which may be a distinct lode, is productive of tin, and, probably, worth 15/- per fm. In the 50 fm. level (which may be driven under Hope's shaft in the course of next month) is a very promising lode, soft ground, but poor. Hope's shaft is in course of sinking under the 10 fm. level, at 8/- per fm.—has a large promising lode, but poor; it is probable that this shaft may be sunk to the 50 fathom level in the course of five months, which will most likely drain the levels in the eastern division of the mine, from which part we may derive some assistance. The levels driving on the Llandower lode, with the exception of the deep adit west, are poor; in the latter level the lode yields 2 or 3 tons of ore, of low produce, per fathom. The backs on the Llandower lode continue productive, and there is a good course of ore in a winze sinking under the adit, and a good lode of ore and tin in a winze sinking under the 10. The back of the 60 east and west on the old lode is at work on tribute in four pitches, at 6s. 8d., 10s., 11s., and 11s. in 17. We are raising as much of ore and tin together as we have ever done, and, at a fair standard, should be making some profit.—[This report was read at the meeting of adventurers on the 18th inst., the particulars of which we gave in our last.]

**CWM ERFIN.**—Capt. S. Nicholls (June 17) reports.—The lode in the engine-shaft is 2 ft. wide, with some strings of ore leading through it. The men in the whim-shaft have sunk 4 fms. 6 ft. this week; the lode is just as last reported; the eastern end is still poor. The stope, west of whim-shaft, is worth 8 cwt. of ore to the fm.: the stope, east of whim-shaft, is worth 10 cwt. of ore per fm. The stope, west of eastern shaft, is worth 6 cwt. of ore per fm.

**DEAN PRIOR AND BUCKFASTLEIGH.**—Capt. H. Choate (June 21) reports.—In the 80 fm. level, east of engine-shaft, I stated in my last report that we were driving to cut the south part of the lode; this being effected, the branch, or limb of the lode, is 15 in. big, composed of spar and capel; but at present unproductive. We have again commenced driving on the north, or main part, of the lode—being large, and composed of capel, spar, and mundic, and spotted with ore; in the end, driving west, in this level, the horse between is diminished, and the north and south parts, or two lodes, as we may term them, are nearly together—carrying a small string of flookan; the south part is about 8 ft. big, composed of capel and a great quantity of mundic; the north part not being cut through, apparently is very large, composed of spar, capel, and mundic. The change of strata in the engine-shaft is most favourable; and I am quite cheered with the prospects of its continuing to the next level, for such ground seldom fails to bring us in contact with the lode. I do not hesitate to say, the prospects are very encouraging.

**DEVON AND COURTENAY.**—Capt. N. Secombe (June 20) reports.—In the end driving west on the gossan lode, the lode is at present divided into small branches, owing to a small cross-course we have intersected in driving. The lode in the winze, in the bottom of the 40 fm. level, which has been productive of good saving work, has this week been intersected by a slide, through which the men have not yet sunk. In the end driving north from the south lode, to intersect the gossan lode, the ground is not quite so favourable as last week. The sumpmen having nearly completed cutting the plat, in the 50 fm. level, they will commence driving to cut the lode east of the cross-course in the back of this level, at 4s. 6d. in 17.

**DRAKE WALLS.**—Capt. Richard Williams (June 19) reports.—Brenton's sumpmen have commenced stowing east below the 50 fm. level; these stopes are producing saving work; in the stopes east of Brenton's, below the 40 fm. level, are good branches. In machine shaft, sinking below the 50 fm. level, is saving work; in the stopes, east of machine shaft, below the 40 fm. level, are good branches; in the stopes, east of machine shaft, behind the 53 end, are good branches. In the 33 end are very good branches, and the ground favourable for driving; on the north lode we are still driving by its side, the ground being favourable; we intend cutting through the lode at the end of this month, and hope to be able to give you a favourable report. We have broken upwards of 200 cubic fms. of ground for April and May, and by the ordinary mode of dressing would, at least, give us 44 tons of tin, which, with a fair price for tin—say, only 36/- per ton—would leave us in receipt of profit of full 250/- per month over our current cost, and we are now in a position to increase our return 50 tons per month in the eastern part of the mine; but, with the present low price of tin, we cannot do anything to profit therefrom; I recommend limiting our operations as much as possible, until a better price can be obtained, or otherwise stock the tin for the present.

**EAST CROWNDALE.**—Capt. S. Paull (June 17) reports.—The lode in the 58 fm. level west is 4 ft. wide, composed of capel, prian, mundic, spar, flookan, and, at times, good stones of ore; the lode is hard and firm, and the appearance of it is improved since my last report; in the end, driving north in the 58 fm. level, there is a change in the ground for the better; we have also cut a stream of water in this place, and I expect that we are approaching near the north lode. The appearance of the lode in the 47 fm. level west is just pre-

cisely the same as when last reported upon, about 8 inches wide, composed of capel, peach, mundic, spar, and blend; the sumpmen in the engine-shaft have been the principal part of the past week engaged in easing and dividing the shaft, fixing lift, and other necessary work, preparatory to the engine being set to work. I am glad to state, that the adit level, driving on the south lode at Rix Hill, still continues to look very well; the lode is increased to 6 ft. wide, 4 ft. of which must be stamped and dressed—is composed of peach, spar, prian, and tin; and, from the strength and size of the lode, I confidently expect this productive lode will be continuous.

**GREAT MICHELL CONSOLS.**—Capt. T. Richards (June 21) reports.—The lode in the 45 fm. level, east of the sump winze, contains mundic, spar, and fluor, with ore intermixed throughout; in this level west the lode is, throughout the part being carried 4 ft., more promising than at any previous point of the driving, containing mundic, fluor, and spar, with rich stones of ore. In the 35 fm. level west, there is no alteration; the lode consists of an abundance of very strong mundic, capel, and spar, with small proportion of yellow and black ore. The parcel of ore sold on the 1st inst. weighed, on Monday last, 58 tons 15 cwt.

**HOLMBUSH.**—Capt. W. Lean (June 20) reports.—The lode in the 132 fm. level, west of the diagonal shaft, is without important alteration since last reported on. The lode in the 120 fm. level south is 4 ft. wide, composed of spar, prian, and lead—worth 5/- per fm.; the lode in the rise above this level, is also large, and producing some saving work. The lode in the 110 fm. level south is 4½ ft. wide, composed of quartz and lead—worth 4/- per fm. The lode in the 100 fm. level south is 2½ ft. wide, composed of soft spar, with spots of lead scattered throughout the lode, saving work. The flap-jack lode, in the 100 fm. level east, is 3 ft. wide, still producing mundic, spar, and spar, with spots of copper ore, with favourable ground for exploring. The lode in the 90 fm. level south is 2 ft. wide, composed of spar and stones of rich silver-lead ores, and opening tribute ground.

**KIRKCUDBRIGHTSHIRE.**—The agents (June 17) report.—The 50 fathom level, west of Stewart's shaft, on main lode, which is 3 ft. wide, with a good stone of ore on the south side, is yielding 4 ton to the fm.; in the north lode, in the west end in this level, the lode is 2 ft. wide, worth 8 cwt. of lead per fm. In the 40 fm. level, west of Keith's shaft, the lode is 8 feet wide, worth about 8 cwt. of lead per fm.; in the 40 end east, on the counter, the lode has improved this week in appearance, but still unproductive. In the 30 end, west of Keith's, the lode is 3 feet wide, greatly improved in appearance, with good stones of ore; the lode in the 30 end, east of Stewart's, is above 8 feet wide, worth about 9 cwt. of lead per fm.—a gradual improvement. Tenotrice lode is improving in size a little, with specks of yellow copper ore in it, but it is in a hard quarry rock still.

**MENDIP HILLS.**—Capt. F. C. Harpur (June 19) reports.—The branch, or lode, on which we have been driving during the past few weeks (alluded to in my report of the 29th of May last) is now become very small—consequently, I have suspended operations here, and resumed driving the 38 fathom level south where the lode is about 1 ft. wide, composed principally of spar and iron—ground rather hard for driving. In the slag department, I have only to notice, that we continue to remove the rubbish from the beds of stuff towards the eastern part of the valley, the appearance of which is much the same as it has been for some time past.

**SOUTH WHEAL TRELAWNY.**—Capt. William Jenkin (June 19) reports.—We are still sinking Snell's engine-shaft below the 30 fm. level, and cutting ground for cistern and bearers in the 2 fms. below the 30—ground favourable. We are also driving the cross-cut west of Snell's engine-shaft with ground favourable, but discharging a great deal of water.

**TAMAR SILVER-LEAD.**—Capt. James Sprague (June 19) reports.—We have finished the penthouse, and shall resume sinking the engine-shaft, below the 175, in the course of a few days; in the 175 end, south of the shaft, the lode continues about 2 ft. wide, and producing good stones of ore; in the same level, driving north, we have not broken any lode since last report. In the 160 end, south of the shaft, the lode is 18 in. wide—work of a coarse quality; in the winze, sinking in the bottom of this level, the lode is 1 ft. wide, composed of capel, spar, and ore—saving work. In the 145 end the lode is 2½ ft. wide, opening ground that will work at a moderate tribute; in the winze, sinking below this level, the lode is 2 ft. wide, yielding work of a promising character. In the 135 end the lode is 3 ft. wide—a promising lode, and passing through ground that will work to advantage; in the winze, in the bottom of this level, the lode is also improving—it being about 2 ft., 1 ft. of which is good work. At the north mine, we have commenced sinking the engine-shaft, below the 70 fm. level, with all possible despatch; in the 70 end the lode is 18 in. wide, carrying a leader of ore, 9 in. wide—rich work. In the winze sinking below the 60 fm. level the lode is still about 2½ ft. wide, composed of can, with good cubes of ore. We sampled, for May, 78 tons 17 cwt. worth 1 qt. of silver-lead ores, which sold for 1316. 6s. 4d.

**TINCROFT.**—Capt. Peter Floyd (June 19) reports.—Palmer's shaft is now sunk about 6 fms. below the 80 fm. level; in the 80 fm. level west, on East Pool lode, the lode is worth 5/- per fm. The 70 fm. level west is at present in a disordered state, being intersected by various small cross-courses. At North Tincroft, the lode in the 100 fm. level west we have not as yet cut. The lode in the 90 fm. level east is worth 8/- per fm.; the winze, in the bottom of this level, is worth 9/- per fm.; in the 90 fm. level west the lode is of a promising nature, but not rich. In the 80 fm. level east the lode is worth 9/- per fm. The 60 fm. level east is worth 5/- per fm. On Highburrow lode, the 142 fm. level east is worth 11/- per fm. The stopes, in the back of the 120 fm. level, are worth 16/- per fm.; Martin's lode, west of engine-shaft, in the 120 fm. level, is worth 17/- per fm. Chapple's lode, in the 100 fathom level west, is at present poor. The lode in the 90 fm. level west is worth 17/- per fm. The 80 fm. level west is worth 16/- per fm. On Dobree's lode, in the 58 fm. level east, the lode is worth 4/- per fm.; the 58 fm. level west is at present disordered by a cross-course. On Wheal Druid lode, in the 33 fm. level east, the lode is 2½ ft. wide—kindly, but poor; in the 33 fm. level west the lode is 2 ft. wide, with spots of ore. Our tin and copper pitches are improving.

**TERELIGH CONSOLS.**—Captain Wm. Symonds (June 17) reports.—The 120 fm. level, east of Christie's, is driving south-east, to cut the lode east of the slide or cross-course. Garden's shaft, below the 100, is sinking in the country. In the 40, west of ditto, the lode is about 2½ ft. wide, rather more promising, with stones of ore. The 90 west is cross-cutting south, driving to cut the south part of the lode; the 90 east is cross-cutting north; we have cut the lode—it is about 15 in. wide, with some ore—more on this next week. In the 80, west of ditto, the lode is 2½ ft. wide, with a very kindly appearance, and stones of ore. In the 70, west of ditto, the lode is 2 ft. wide, of a promising nature, but only producing stones of ore. In the winze, below the 60 fm. level west, the lode is 2 ft. wide, with stones of ore, not to value. In the 50, west of ditto, the lode is 18 in. wide, worth 3/- per fm.; in the adit east, on Wheal Parent lode, the lode is 2½ ft. wide, of a very promising character, producing stones of ore. We are cross-cutting north of Parent engine-shaft, and driving to cut Wheal Orphan lode.

**WEST WHEAL JEWEL.**—Capt. Richard Johns (June 19) reports.—In the 70 fm. level, west of Williams's cross-course, on Wheal Jewel lode, the lode is 15 in. wide, worth 5/- per fm. In the 57 fm. level, west of Williams's cross-course, on the same lode, the lode is 2 ft. wide, worth 9/- per fm.; in the 57 fm. level, east on ditto, on the same lode, the lode is 15 in. wide, worth 5/- per fm.; in the rise, in the back of the 57 fm. level, on Williams's cross-course, the lode in the eastern side of the rise is 14 in. wide, worth 5/- per fm.; in the deep adit, west of Hodges's cross-course, on the same lode, the lode is 1 ft. wide, worth 3/- per fm.; in the deep adit, west of Quarry shaft, on Tolkarne lode, the lode has not been taken down in the past week. We have set another pitch, in the bottom of the 12 fm. level, to the men that were stowing in the back of this level, at 4s. 6d. in 17.

**WEST WHEAL MARIA.**—Capt. Thos. Ridd (June 19) reports.—In the western engine-shaft the ground for driving, on the cross-cut south, in the 74 fm. level, is without important alteration—rather hard—in which we fully expected to have reached the lode by this time; but, in consequence of the lode taking a greater declination, from the 64 to the 74 fm. level, than it did from the 54 to the 64 fm. level, we have not been able to reach it so soon as we anticipated. The lode in the 34 fm. level, west of Vivian's shaft, is small and unproductive—ground favourable for driving.

**WHEAL MARY ANN.**—Capt. Henry Hodge (June 19) reports.—The lode in the 40 fm. level, south of Barratt's shaft, is 2½ ft. wide, and worth 22/- per fm. The lode in the 30 fm. level, south of Barratt's shaft, is 2½ ft. wide, and worth 4/- per fm.; Pollard's shaft is sunk 7 fms. under the 30 fm. level; the lode in the 30 fm. level, north of Pollard's shaft, is from 1 ft. to 1½ ft. wide, producing can and good stones of lead, worth 4/- per fm. The winze in the 30 fm. level, south of Pollard's shaft, is suspended, on account of an increase of water. The stopes throughout the mine are producing a fair quantity of lead. We sold, on Thursday last, 64 tons of lead ore to B. Somers, Esq., at 17s. 11d. per ton.

**WHEAL SETON.**—Cpt. Paul Rabey and Stephen Lean (June 18) report.—Bull's shaft, sinking below the 90 fm. level, is down from 10 to 11 fms.; ground favourable for sinking; we propose to sink this shaft 2 fms. more, and then to drive to cut the lodes in the 100 fm. level. In the 90 fm. cross-cut north, from Bull's lode, we have intersected Kneebone's branch and the north counter since our last account—the former is 5 ft. wide, and will produce three tons of ore per fathom; the latter is cut 6 ft. into a fine course of ore, and no north wall, and is more productive than in the levels over this place. In the 80 fm. level west, on the last-mentioned lode, we are carrying about 7 ft. of this lode by the north wall, which will produce 15 tons of ore per fathom; the stopes, in the back of this level, will produce 20 tons of ore per fathom. In the 70 fm. level, west on ditto, the lode is small, producing one ton of ore per fathom. Our belief still is, that the principal part of this lode is south; but we have not yet been able to sink the winze to prove it; the stopes, in the back

of this level, will produce 20 tons of ore per fathom. In the 60 fm. level, west on ditto, the lode is 4 ft. wide, producing 2 tons of ore per fathom; the stopes, in the back of this level, will produce about 25 tons of ore per fathom. Boundary winze, sinking in the bottom of the 50 fm. level, on ditto lode, is 4 ft. wide, with occasional stones of ore—down 2 fms.; the 50 fm. level, west of Tilly's shaft, on ditto lode, is 2 ft. wide, unproductive. The 80 fm. level west, on the south counter lode, is 3 ft. wide, containing occasional stones of ore. In the 70 fm. level, west on ditto, the lode is 2 ft. wide, composed of spar, mundic, and stones of ore. The stopes in the back of the 60 fm. level, west on ditto, will produce 6 tons of ore per fathom; the winze, sinking in the bottom of this level, will produce

so as to prepare them to resist the furious attacks they are exposed to during the prevalence of the rains.  
Cost for March—Rs. 28,691 65s. at 27 $\frac{1}{2}$  ..... £2340 12 0  
Produce—17,714 cts.; less duty, 7 per cent., 1940—net, 16,474, at 7s. 6d.. 6177 15 0

**Profit** ..... £2837 3 0

Though these costs are higher than I anticipated, owing partly to the great quantities of iron and other materials used in the preparation of the new stamps, and partly to the large increase (from 50 to 55) which we have lately succeeded in making to our list of free surface labourers, still the profit is very large, and will, I am convinced, prove satisfactory to the board.

**New Works.**—Having devoted a few days to the erection of a rancho for the accommodation of the workmen, I have much pleasure in informing you, that on the 8th inst. a beginning was made with the new water-course, in conformity with my letter of the 28th September last: 41 workmen, under the direction of Capt. William Treloar, are now engaged thereon. The new stamps and new hospital are both being pushed forward with great spirit.

**REAL DEL MONTE MINES.—Mineral del Monte, May 11.**—By the statement of costs and returns for March, you will observe, that a loss of \$12,533 54s was incurred in that month—while, at the beginning of April, the treasurer's statements makes the negotiation to the bad of \$35,600. In the estimate for April, the returns were assumed at 50 bars; but, as only 41 were actually produced, the loss on that month, though not yet made out, cannot fall short of \$20,000. The treasurer's estimate for May, now forwarded, anticipates a further loss of \$15,800 in that period, and a deficit at this date of \$70,600. I am at present most anxiously investigating the several heads of expenditure, to ascertain in which point a material reduction can be possibly effected, without involving a total stoppage of the concern; but I must confess that, at first view, the operations seem so linked together, and connected with the present general and costly draught, that it is indeed a most difficult point to decide and meddle with.

**May 12.**—Respecting the estimates, to which you advert in your February letter, we think, and our opinion is confirmed by the costs and returns for March, that even when made with the greatest care, they cannot be depended on where, as in this concern, there is no stock of smelting ore in sight underground, on which to base the estimates of returns, and when the costs are swelled by such unforeseen charges as appear in the March accounts. How far these excesses and extra charges could have been foreseen in Feb., we leave to the directors to decide. It was expressly stated, in our March letter, that the returns would depend on the casualties to which we have been so long exposed, from the overworking of the engine. The result of April workings, we are sorry to say, will be still more unsatisfactory, the produce being only 41 bars for five weeks, instead of 50, that were expected. Both the costs and returns were affected by holidays, but there are other causes for the diminished returns, which are not so obvious. The diminished produce at Regla arises from the ley of Moran smelting ore having fallen off very considerably; from the best labours at Acosta being under water, as well as from some smelting ore having remained over to the present month, caused by the delay of the holidays. If the view taken of the company's concern in February was a gloomy one, that now before us is more so. The heavy losses sustained in February, March, and April, have placed us in a much worse position.

**UNITED MEXICAN MINES.—The following advices have been received:**

*Report of the State of the Workings of the Mine of Rayas.*

**May 1.—La Purisima.**—In this portion of the mine there is nothing new to remark, nor is there much room to hope for improvement. It is ground where the vein is so much worked out, that any improvement must be of short duration.

**San Pio—Los Reyes.**—In the roof of this old working three barrens have been employed in extracting some fair ore from the roof. In Los Reyes the work is terminated—at least for the present.

**San Cayetano.**—The dry wall in the pit of San Pablo is concluded; but material for filling up is required, to create a sufficient support for the roof, to enable us to extract the greater portion of the small, but good, pillars existing in that vicinity.

**Santa Cecilia.**—This cross-cut has advanced during the month 4'32 varas, without any material change.

**Santo Toribio.**—The works for the ventilation of this portion of the mine did not prove as efficient as was expected. A modification of the original plan has been resorted to, which is nearly concluded, and thus far proves well. In the workings of the Santo Toribio, 65 barrens have been employed. The end, to the south-east of Santo Toribio, continues in good ore. San Miguel, which is also going south-east, and below, is more advanced, and is also in very fair ore. The lower wall is well defined, and the ore more concentrated than it has been heretofore. Next, below and to the south-east, is the end of Dolores, where the ore is very fair—a portion of it rich. From San Miguel, a pozo, called San Alejo, has been commenced, which will come down on Dolores, near the present end. The pozo of Santo Toribio, the deepest point in those works, contains good ore in the south-east end, and indicates a gradual inclination of the mass of ore to the south-east in descending. The ends to the north-west, both above and below Santo Toribio level, are poor, indicating that we have reached the limit of the ore in that direction. In the Contra Cielo, and the end thereto from the south-east, the ore is poor. In these workings generally, the vein has a more than usual underlay, and the ore is, in many places, much mixed with, and running into, the mountain rock. The exterior workings in San Miguel shaft, for the construction of other whisms, is going forward, but has been retarded by the superior urgency for employing masons and materials in the underground work, for ventilating the productive works of Santo Toribio.—S. P. PARKMAN.

**Guamánuco, May 5.—Mine of Rayas.**—I have now the pleasure of stating, that the point of Santo Toribio continues in the same promising state as when I last wrote you. It has increased in produce, and its appearance still continues very favourable. Its production, during the last month, would have been somewhat more, had not the works, carried on for the purpose of ventilation, failed in their object; they at first promised well, but eventually proved quite inadequate to the necessary supply of air. The water in the great shaft is gradually decreasing. I enclose Mr. Parkman's report to the 1st.

An enclosure is the usual comparative statement for the last five weeks:

Five weeks ending ..... Picked Ores. Half Sales. Outlay.

March 25 ..... Cgs. 4611 ..... \$3079 1 0 ..... \$31,436 0 0

April 29 ..... 5789 ..... 4188 7 0 ..... 31,997 6 4

Cargas—1178 \$890 2 0 \$561 6 4

Increase. Decrease. Increase.

**Haciendas.**—These are all employed as per my last. If Mr. Schoolbord be delayed by any untoward event beyond the next packet, I must immediately commence building, or decide upon selling some of the Rayas ores, which our contract enables us to do.

**Quicksilver.**—I have made no further purchases of this article since my last than the 80 bottles (60 quintals), which I then advised I was in treaty for. I shall have to buy again very shortly, but I expect to obtain a further reduction in the price.

**Railances.**—As the road to Tampico is now considered safe, and the regular conductor proposes to leave for that port in 10 days, to meet the packet that ought to arrive there the middle of June next, it is my present intention, should he obtain funds enough to induce him to go, to send the sum of \$70,000, to be shipped on board the West India mail steamer of that month, duties and expenses paid.—WILLIAM HEATH.

**Note.**—This remittance includes the sum of 40,000 to 50,000 dollars, mentioned in his letter of the 3d April, which is now thereby increased to 70,000 dollars, and is exclusive of the bill for 12,000 dollars, also alluded to in the letter previously quoted.—JOHN MATHER, Secy., London, June 21.

**QUEBEC MINING COMPANY.**—We have received a detailed report of the operations at this company's mines in Mica Bay district, by Capt. O. H. Matthews, the resident agent; and also from Messrs. Hall and Bray, two gentlemen well acquainted with mining pursuits. From these reports, it appears that the mining operations of the company were progressing in a manner highly satisfactory, and the excavations attended with gratifying results.—Having ascertained that "Paterson's" Mine held out the best prospects of early success—the chief part of the force has been concentrated there. The surface indications were always of high promise, and, from the first, yielded rich specimens of concentrated grey ore. The present end of the level is 25 ft. through the lode, without having seen the north wall. The cross-cut yields grey ore, native copper, and frequent developments of silver, diffused throughout the entire rock in minute particles. It was calculated that there was in a position to be taken away, 30,000 lb. worth of copper ore, which the miners offered to take on tribute from 4s. to 6s. in the lode. In Le Mesurier's Mine the indications were also of high promise—the veins being well developed, and producing grey ore at surface. This section of property was considered of twofold importance, as in addition to the value of the mine, it was likely to be the spot at which the harbour in Mica Bay, both for imports and exports, would be established. The property of the company consists of the most productive land, on which can be produced all the necessities of life, and teeming with cedar, red and white pine, maple, and birch, with a good portion of meadow land. Mica Bay, the station of the proposed harbour, is said to be a delightful spot, to which a road from the works could be cut almost on a dead level.

**MINING IN SOUTH AUSTRALIA.**—The exports of copper and lead ores from this province during the past year have been declared, in a semi-official form, at more than 180,000t. The exports of the present year will, undoubtedly, far surpass in quantity and quality the one gone by; but these features of improvement will not be all of which we shall have to boast. Hitherto the exports of lead or silver-lead ores have formed a small proportion of the gratifying export aggregates of the colony; but, according to present appearances, the disparity will henceforth not be so remarkable. The silver-lead mines of Glen Osmond are being vigorously and successfully prosecuted; and to the productivity of the contiguous property of Wheal Watkins, is about to be added a like productiveness in Wheal Gawler, also adjoining. These three properties present a longitudinal continuation of metalliferous ground, more than equal to the celebrated East Wheal Rose, of Cornwall; and as we are upon the question of quantity, it may not be amiss to acquaint the uninformed as to what is elsewhere accomplished in lead minerals within a limited space. We have it upon authority which we cannot doubt, that as large a quantity as 700 tons of silver-lead ore, averaging 16s. per ton, was raised, sampled, and sold, at East Wheal Rose, within the period of a month in the last year. We do not pretend to draw any inference in favour of the silver-lead mines of this province, but merely to state the fact, that instances of very large production have elsewhere had as small beginnings and tardy success as similar undertakings in this province.—Adelaide Observer.

#### ACCIDENTS.

**Fatal Boiler Explosion.**—At a few minutes before nine o'clock, on Saturday morning last, a dreadful case of boiler explosion took place at the Sovereign Mill, London-road, Preston, which so injured a number of persons, that seven have died, and several remain severely hurt; several of the men had breakfasted in the engine-room, and were just going to recommence work, when the boiler burst with great noise—overthrowing the brick wall on one side—scattering the materials, steam, and hot-water, in all directions; the immense body of steam which escaped, with some of the wreck of the boiler-plates, were forced into the room above, and the windows of every story were completely shattered. Three surgeons were immediately on the spot, and gave every possible assistance. The cause of the explosion appears to have been an insufficient supply of water, by which a part of the boiler became red-hot. The verdict of the coroner's jury was, "Accidental death."

**Clyforth.**—John Price was killed at Robin's Pit, by a fall of ironstone from the top of his shaft, while he was working on the trams at bottom. No accident had happened at this pit for 17 years.

#### NATIONAL BRAZILIAN MINING ASSOCIATION.

A special general meeting of shareholders was held on Tuesday last, at the offices of the company, and adjourned from thence to the London Tavern, in consequence of no preparations having been made for holding the meeting; and, moreover, it being stated that Mr. Oxenford had the keys, and possession of the books and papers of the company. Mr. W. R. Collett, attended by Mr. Irving, and several influential shareholders, and accompanied by the secretary, therefore, at once proceeded to the London Tavern, when the chair was taken by W. R. COLLETT, Esq.

Antecedent to the meeting proceeding to business, a question was raised by Mr. Hartley, whether the chairman should preside, or that the voice of the meeting should be taken; but Mr. Collett having stated that, as chairman of the company, it was his office to preside, and that he should not relinquish the right which he claimed, no further objection was raised.

We may observe, that a printed statement, signed by Mr. E. Oxenford and Mr. Wm. Hamilton, as two of the directors of the company, was very generally circulated, a copy of which will be found in another column. It was not read or adverted to at the meeting at any length, or any reply put forward, except in the course of the chairman's address, when he denied the correctness of the deductions drawn by the directors. We will, however, proceed to briefly report the business of the meeting.

The CHAIRMAN prefaced his observations by stating, that the meeting had been regularly convened, and was a legal meeting—the notice having been signed by a majority of the directors and the secretary, who was then present. Mr. Irving, who was also a director, and holding 1400 shares, not only recognised the acts of him (the chairman), but was then also present, and would, doubtless, take an active part in the proceedings.

Mr. BOWER, the solicitor of the company, felt it his duty to raise the question,

whether Mr. Irving was in fact a director—that gentleman, from peculiar circumstances, not having attended the meetings of the company; and, indeed, the whole of the business and responsibility had devolved upon Messrs. Oxenford and Hamilton, whom he might, in some degree, be said to represent. He had to express his regret at their absence, but it was his duty to observe the instructions given him. He fully admitted, that neither Messrs. Reid nor Irving had resigned, nor had they received any notice from their co-directors or from any meeting of shareholders; but he considered, from circumstances, that they had ceased to hold office, having taken no active part, nor incurred the responsibility referred to, and to which the other directors were subjected.

A general conversation took place, as to the courtesy observed on one side and the other, in which the chairman and solicitor took an active part—it being stated by the latter that Mr. Collett had not treated his colleagues in a becoming manner, and that matters had been determined upon an improper haste, at the same time excusing the absence of Messrs. Oxenford and Hamilton under the peculiar circumstances in which they were placed. The directors did not object to Mr. Collett, or any other proprietor, proceeding to the mine for his own satisfaction; but they could not recognise him as an agent, or subject the company to the expense of his survey, or depute to any individual the powers which were vested in them as a body.

JAMES CLAY, Esq., M.P., as a proprietor, felt called upon to offer one or two observations at this stage. He considered that the chairman, in proceeding to Brazil, did not go out in the character of an agent of the company, but, at least, he should be recognised as the chairman of the board of directors: it was in such latter capacity that he looked upon him; and he had no hesitation in declaring his opinion, that the proprietors, as a body, were indebted to him for his services. That gentleman had devoted much time and attention to the subject, and had been at a considerable expense in arriving at the results.

He had caused the auriferous ore to be crushed, and the results taken, and the report made by him had been verified by the officers of the company on the spot, who had expressed themselves as perfectly concurring in the opinion entertained by him.

Mr. (Clay) considered the important, and indeed vital, question was, whether the proprietors should continue to work the mines on the old system or the new; by which latter he meant that suggested by the chairman. He was sorry to find that a feeling existed which was of a one-sided nature, and characterised by disingenuousness on the part of the directors who had signed the printed report, towards the gentleman who then presided. He would refer to page 3 of their report, where the deduction was drawn which, as he was advised, was false. The words he referred to were as follows:—"Now, it would be as wise to take down eight tons of chalk from different parts of the cliff, in order to form an estimate of the quantity of flint contained in the whole bed, as it was to pound eight tons of the ore of the Serra Velha, for the purpose of ascertaining the exact value of the whole lode" &c. Now, he considered it only right to state, that the ore subjected to trial was taken from 10 different places, and not in any way confined to one immediate spot. It had been said that the object of Mr. Collett, their chairman, was to go out and hold an appointment under the company; he felt bound to say, that he had put the question to that gentleman, whether he would go out, and, much to his regret, it had been met by a negative—inasmuch that such was not his intention, nor would it suit his convenience.

The CHAIRMAN begged leave to recapitulate one or two observations he had made at the meeting held last week. It was in March, 1847, that he had been unanimously elected as a director; he had, with the concurrence of his colleagues, been appointed their chairman, and, at that time, the balance in the hands of the bankers was only 30t., while the liabilities were 35,000t. Being no longer a Member of Parliament, he proposed going out to visit the mines, and to correct, so far as lay in his power, the errors which he considered had been committed. He simply required that the expenses to which he might be subject should be paid: he put forward no claim for services, or loss of time. His colleagues, at least so far as Messrs. Oxenford and Hamilton were concerned, however, did not, for reasons best known to themselves, concur in this reasonable demand, and hence the course he had pursued in Justice to the body of proprietors and to himself. He had put before the shareholders simple facts; he had not allowed a chance of misrepresentation, for the remarks he had to make to those he had committed to paper, and it was from the manuscript he had read at their last meeting, the observations he wished to submit to the attention of the proprietors. He had consulted with the resident agents, and with Capts. Bate, Treloar, Kingman, and others, from whom he had derived much valuable information, and who concurred in the views entertained by him. He professed to be acquainted with geology, and more particularly as applying to mining operations; and, from the opportunities afforded him of ascertaining the geological features presented by the Morro Velho and St. John del Rey Mines, he was perfectly satisfied that the conclusions at which he had arrived were right, and which were, indeed, admitted by all parties at the mine, or who possessed any practical knowledge, or experience. It was quite clear to him that they had been pursuing a course, for the past 15 years, which he had not hesitated in saying, was wrong, and diametrically opposed to that which should have been adopted, and to which he now wished to direct the attention of the shareholders. He considered that retribution should take place, that their forces should be concentrated at a different system, as regards the working of the mine, or returning the ore, should be adopted; and it was with this object that he had called the shareholders together. In arriving at the results which he had submitted at the last meeting, he had only to observe, that he had caused every cubic foot of ground to be measured which had been excavated in the course of the workings. He had submitted to test different portions of the lode, which had been attended with a general aggregate result, and it was with pleasure that he referred to a gentleman then present (Dr. Cliff), as being largely connected with Brazilian mines, who, he doubted not, would confirm the correctness of his representations.

Mr. GREENAWAY begged to observe, that the chairman was clearly in error, as to the value he put upon the gold extracted from the mines. He (Mr. Greenaway) had entered

into a calculation, which was very simple in itself, whereby it was proved that, while Mr. Collett contended it was only worth 40t. the lode, it was really worth 46t. 12s. This he considered an important feature, as touching the accuracy of the statements submitted by that gentleman on other points, to which the attention of the meeting had been directed. He had closely examined the reports which had been, from time to time, submitted to the proprietors, and had particularly noticed the produce of the Cuiabá and the Coches gold. He had no hesitation in saying, that the chairman was in error, as to the value he had put upon the gold—the figures were altogether incorrect; as, from the deductions drawn by the chairman, instead of 34t. 17s. 9d. per ounce, which was the value, he had calculated it only at 34t. 6s. 8d.

The CHAIRMAN interposed, by observing, that the rate of the gold produced could only be taken at 39t. 10s. ad.—the figure fixed by him being 40t. as a round number. If then this difference, which he contended should be allowed, was admitted, there would be a difference in the calculation of at least 700t.—Mr. GREENAWAY, in reply, observed, that the remarks he had made applied generally. He was not present at the first meeting; but, having read a report of the proceedings thereof, he had deemed it right to be present on this occasion. Now he contended that the estimates, or figures, submitted by the chairman were anything but correct. He had already cited one instance; and he would follow on by saying, that the English stat. set down at 2000t. a year, did not amount to one-half. Again, it was introduced into the accounts the cost attendant on railroad rails and other works, which should fairly be thrown over a given time, and not be confined to the operations of 12 months. The gross expenditure was set against the net returns, while, had the proper system of accounts been adopted, only a certain portion, or percentage, should have been applied. Instead of a loss having been sustained by the workings at Cuiabá, he had no hesitation in stating that, upon a fair reversal of the accounts, so far from being sustained, the results would show a balance, however trifling. Indeed, if the accounts were carefully looked into, as had been done by him, it would be seen that the whole charges were only 16s. per cent.—while they had been represented at 20 per cent.; this would be readily demonstrated by referring to the records of the company. He considered that the scheme entertained by Mr. Collett was rash in the extreme; that gentleman had only been appointed in March, 1847, and then proceeded to the mine, without the assent of the directors, or knowledge of the proprietors.

Dr. CLIFF stated to the meeting, in reply to a question put to him, that the value to be set upon the gold was 40t. to the Brazilian pound.

Mr. KESBLE (late M.P.) submitted, that the more proper, and, indeed, most prudent

course, would be to appoint a committee to investigate into the affairs of the company, and to report thereon.

—The CHAIRMAN thanked the hon. proprietor for the suggestion, and will henceforth not be so remarkable. The silver-lead mines of Glen Osmond are being vigorously and successfully prosecuted; and to the productivity of the contiguous property of Wheal Watkins, is about to be added a like productiveness in Wheal Gawler, also adjoining. These three properties present a longitudinal continuation of metalliferous ground, more than equal to the celebrated East Wheal Rose, of Cornwall; and as we are upon the question of quantity, it may not be amiss to acquaint the uninformed as to what is elsewhere accomplished in lead minerals within a limited space. We have it upon authority which we cannot doubt, that as large a quantity as 700 tons of silver-lead ore, averaging 16s. per ton, was raised, sampled, and sold, at East Wheal Rose, within the period of a month in the last year. We do not pretend to draw any inference in favour of the silver-lead mines of this province, but merely to state the fact, that instances of very large production have elsewhere had as small beginnings and tardy success as similar undertakings in this province.—Adelaide Observer.

Mr. COLLETT, in replying, said, that the more proper, and, indeed, most prudent course, would be to appoint a committee to investigate into the affairs of the company, and to report thereon.

# THE MINING JOURNAL,

we have declined sanctioning by our presence, either at a board or public meeting, their titles to reassume their character as directors. Mr. Collett, who was a party to all the above measures, will be able to explain his consistency in this respect.

It now only remains for us to state, that we have no wish to maintain our present position. Through many painful difficulties and trials we have acted to the best of our ability—our decisions may have been wrong, and our judgment defective—but our course has always been honest and straightforward, directed to what we conceived to be the best interests of the association.

Upon a notification from a majority of those shareholders who have paid their instalments, we will immediately make over the properties in Brazil, standing in our names, to the parties who may be duly appointed, upon being released from responsibility, and paid the money due to us. We shall not attempt in any way to bias your decision upon this matter; but, should you desire our continuance in office, we shall proceed alone in the management of our affairs, in the same manner as, with small intervals of interruption, we have done for many years; and, at an early day, we shall be prepared to submit to your decision such an augmentation of the board as we hope will be satisfactory to all parties. Not to give pain to Mr. Collett, we have abstained from publishing his letters to us; but should our statements be disputed, our solicitor will attend the meeting, furnished with all the correspondence, and prepared to read it if required.

26, Throgmorton-street, June 19.

E. OXFORD; W. HAMILTON.

## CAMERON'S COALBROOK STEAM COAL COMPANY.

A meeting of shareholders in this company was held, at the London Tavern, on Tuesday last, the 20th inst., to take into consideration the present state of the undertaking, and to decide upon any steps that might be deemed expedient.

C. BURLS, Esq., jun., in the chair.

After the circular, convening the meeting, had been read,

The CHAIRMAN regretted that no other shareholder of larger interest and influence in the company had been selected to preside. He must, in the outset, disclaim all hostility to the Cameron family. They were the owners of the mine—they held upwards of 11,000 shares. They were to have a royalty from the working; and they were, so to speak, covenanting parties with the shareholders to do the best they could for the good of all. It was, therefore, impossible to suppose that they had any other wish than to put the company upon the best footing. He, at any rate, disbelieved the idea, and no act of his should indicate the contrary. He regretted, indeed, the necessity of this meeting at all; but, from the present large and respectable assembly, it was evident that he was not alone in the opinion, that it was time for the shareholders to consider their position, and act their part. Let the meeting, for one moment, look at the price of the shares: 6d. per share had been paid up—dividends of 1d. and 8 per cent. had been paid, and yet shares would realise scarcely more than 1d. each—and, even at that price, buyers would not register, so that sellers, after a large sacrifice, were still liable upon their shares. Could anything better demonstrate that the public had no confidence in the management? They disbelieved (as he did) in the dividends being paid from profit. Notwithstanding it had been stated that such dividends were below what might have been declared, it was his firm conviction, that no 12 men, accustomed to compute dividends, and wishing to act prudently, would have ever declared one penny from such returns, and with such expenses as belonged to this company. Dividends were not expected from young concerns; it was known they had difficulties often greater than was anticipated, to contend with; and shares bore a better price, even without a dividend, but where prudence and forethought were indicated, that when, as in the present case, there was great talk of profit, but evidently a serious want of judgment and discrimination. Then look at the expenses; under the excitement of a large dividend, the shareholders had voted 2000l. a year to the directors (glad was he to think that he was not a party to the vote). The secretary had 500l. a year, an under clerk 200l.; how much to the solicitor? It was impossible to say—with a London establishment, as well as the Swansons' staff; and all for what?—to work a mine. He would ask if Lord Londonderry, Lord Ravensworth, or any other mine-owner, would sanction such an expense for working one mine? Look again at the report and accounts. Could any one from them judge of the real state of the company? It was utterly impossible; indeed, the secretary appeared of this opinion, for he had stated him (the chairman), that before the next meeting he would use his best influence to have a full and explicit account rendered to the shareholders. Seeing one of the auditors present, he hoped he might urge upon him to pass no account which did not explain itself. If such an document as the last should be again presented for audit, he hoped the auditors would tell the directors to offer it themselves to the general meeting, and not give it the importance of their (the auditors') sanction. Four lodes have been discovered, three running nearly north-west and south-east; the two Gresson lodes, 5 ft. big, with lead and copper in them, underlying north, the other south, and will form a junction about 50 fms. deep; also a lode due east and west, 6 feet wide, composed of strong gossan, capel, jack, &c., which is expected to form a junction with the other three, about 120 fms. west, in the adit level.

## SPANISH MINES.

An official statement has been published of the quantity and value of the products of the Spanish mines during the last year. The total value is estimated at 169,017,548 reals (1,700,000*l.*) The principal items are as follows:

	Quantity.	Value in reals.
Iron, wrought and cast, &c.	Quin. 884,658	58,636,975
Lead and its compounds	743,442	40,048,383
Quicksilver	22,088	38,235,557
Silver	Marks 111,659	21,215,210
Coal.	Quin. 965,224	3,860,896
Copper	8,380	3,771,319
Alum	9,063	725,108
Zinc	1,780	258,129
Gold	Marks 80	230,400
Sulphur	Quin. 3,322	186,086

**MINING IN MEXICO.**—The last advice by the West Indian mail are more cheering to the mining interest; the long-talked-of treaty between the United States and Mexico is now amicably arranged, to the satisfaction of both parties, and the next arrival will announce its final ratification. The United States bind themselves to acknowledge all the rights possessed by the mining adventurers in New Mexico, or the territory ceded to them by the treaty, and that they shall enjoy the full privileges of American citizens. The termination of this aggressive and expensive war will have the most beneficial effect on mining operations throughout Mexico, which have been nearly suspended during the contest and occupation of the invaders, as the miners neither considered themselves, nor their property, safe in the conflict.

**MINING IN FRANCE.**—There still remains a great uncertainty among the mining interest as to what measures the Government intends to propose, regarding the working of the mines throughout France and Algeria, as it has evidently evinced an intention to appropriate many of them, the same as they have done several of the railways, allowing the different companies, or private adventurers, a certain bonus, or per centage, of *rentes*. Hitherto, the working of the mines in France, whether coal or metallic, have been chiefly confined to a few wealthy individuals, or companies, who have formed a complete monopoly, to the great detriment of minor adventurers, whose capital is limited, and concessions small. The recent events in France have had a withering influence on mining operations; and there is a general depression in all the mineral districts—the monetary resources of the adventurers being much curtailed, and the demands confined for coals and metals. These circumstances have caused a monetary panic—so that but few mines are in full work. Added to the above, the projected alteration in the tariff duties on foreign iron and coal has also been one of the great causes of depression, as the mining interest and the forgemasters keep their stocks very confined, until the result is ascertained. In the different arsenals, great activity prevails in the Marine Department; and several steamers are undergoing a thorough change, by having new engines of greater power and improved principles; whilst at the different Government foundries, great quantities of cannon are being cast, and large orders for muskets, &c., have been entered into for the army, as the Government, seeing the warlike preparations making by Russia, are determined not to be taken by surprise; not only is the regular army to be greatly augmented, but the forgemasters keep their stocks very confined, until the result is ascertained.

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**BELGIUM.**—In consequence of some large orders received from Denmark for arms, a great activity prevails at several of the large foundries, which, however, is only momentary; whilst, unfortunately, the mining operations in general are extremely confined, as the exports to France and Germany, of metal and fuel, are very limited—both money and confidence being very low.

**SHARES IN SOUTH AUSTRALIAN MINES.**—At a sale, by auction, at Adelaide, on the 5th Feb., an original Mount Remarkable share (500*l.*) sold for 250*l.*; Parina, 3*l.* per acre; North Kapunda, 6*l.* 5*l.* shares, at 1*l.*; and an original 5*l.* Burra Burra scrip, for 17*l.*—(20*l.* dividends to receive)—for the last bar-gain, 2*l.* was immediately offered in the room. This would fix the price of registered shares at 15*l.*

## GOOD WHEAL ROUGH TOR.

Sir,—Seeing the report of "An Old Miner," in last week's Journal, I visited this mine. I find all his statements are substantially true: he gives his report up to the time of their intersecting the large branch in the shaft; it is more than 1*ft.* wide, and carries very good stones of copper ore. Since that time, there have been other very important changes and indications; they are now passing through very fine veins of malleable copper—some of them as thick as a man's finger. I never saw a finer lode, nor better indications in sinking through the country—it improves every fathom they sink. I am also

AN OLD MINER.

**TREVEAN MINE.**—At a meeting of adventurers, held on the 7th inst.—J. MOLLET, Esq., in the chair—it was resolved that, the accounts having been allowed, a call of 1*l.* per share be made, and paid to the secretary.

**WHEAL SPEED.**—The adventurers in this mine received a profit of 5*l.* per share at their last account, being the first dividend paid during 12 years.

According to the *John Bull*, Mr. James Watt, of Birmingham, recently deceased, has bequeathed 50,000*l.* to Lord Brougham. If this report be true, we presume the bequest was made in consideration of his lordship's eloquent and successful vindication of his father's claim to the discovery of the composition of water, in opposition to that of Cavendish.

**COUPLING AND BREAKS OF RAILWAY CARRIAGES.**—The Railway Commissioners' Report upon Railways has brought the ingenuity and talents of Mr. Samuel Thornton, mechanical engineer, of Bradford-street, Birmingham, into exercise. That gentleman has introduced an improved, but simple, coupling for railway carriages and luggage trucks, without rendering necessary the dangerous system of a man going betwixt the carriages to couple them, whereby many lives have been lost. By Mr. Thornton's improvement, all such risk of life will, for the future, be avoided. His next invention is an improved break for railway carriages. By the simple machinery attached to this break, the engineer, or guard, can apply any given number of breaks that the station-master may think proper to place under his command. Models and drawings of these improvements have been before the Railway Commissioners and their inspectors, Mr. McConnell, and many other engineers, all of whom have given their opinion that Mr. Thornton has arrived at an improvement which has been long desired.—*Railway Record.*

**EXPORTATION OF THE PRECIOUS METALS.**—The following are the official returns of the exports of gold and silver from the port of London for the last week:—Gold coin to Rotterdam, 1700 ounces; ditto to Hamburg, 285; ditto to Calais, 94; ditto to Havre, 801; ditto to New York, 900.—Silver coin to Rotterdam, 51,500; ditto to Belgium, 21,570; ditto to Hamburg, 10,000; ditto to Boulogne, 100,000.—Silver bars to Rotterdam, 138,500; ditto to Hamburg, 92,500; ditto to Belgium, 1600.—Silver coin to the British West Indies, 100*l.*

RHOSWIDDOL AND BACHEDDON LEAD MINES.—From the accounts of these mines, for April and May, it appears that the receipts, to the end of March, had been 23,349*l.* 6*s.*; calls received in April, 258*l.*; ditto in May, 141*l.*—23,748*l.*—By expenditure to last account, 22,965*l.* 0*s.* 5*d.*; costs for the two months, 583*l.* 1*s.* 5*d.*—leaving balance at banker's of 399*l.* 12*s.* 2*d.*—From the report of Capt. Davis, it appeared, that in Prosser's level they had cut the lode, containing solid cubes of lead in crystallised quartz; and though not returning a profit, was the greatest encouragement in that level which had yet been seen. In Field shaft, the men had fairly got to work in the good run of lead; and, as they were rising in it, it improved. From the Smithy level, the ore had been assayed, giving 78 per cent. of lead, and 2 ozs. of silver, to the ton. In Nant level there were three stoping bargains—two of which returned fair ore. The grey ground opened, on the north lode, was 295 ft., and 55 ft. on the south—making 350 ft. of ore ground in Nant level. At the last sale of ore, the assay was 77 per cent., and yet the price was exceedingly low, producing only 8*l.* 10*s.* per ton.

**SOUTH WHEAL BETSEY.**—They have commenced driving to cut the newly discovered lode in the deep adit, which is 40 fms. from the surface. The ground is soft, 2*l.* 1*s.* per fm.; and it is expected they have about 8 fms. to drive to cut the lode from the adit, and that a course of ore would be open in both lodes in about a month from this time. The new lode at surface has a very splendid and important appearance.

**WEST WHEAL TREASURY.**—In consequence of some very prejudicial remarks, which had been circulated respecting the above mine, the shareholders, at the last account meeting, requested the purser to have an inspection of the mine, for their satisfaction, as to the propriety or otherwise of continuing operations through the ensuing winter;—and hence the report of Captains John Richards (of Great Consols) and C. Thomas (of Dolcoath Mine), whose opinions and judgments, which here follow, will prove quite sufficient to remove any false impression made by the rumours above referred to. They state that, after a minute and careful survey, they estimate there are 1200 tons of ore in sight, of average quality, and that by a judicious mode of working it could not be taken away in less than 12 months; that they are of opinion, that, taking the cost at 370*l.* per month, with even the present depressed state of the standard of copper ore, it will meet the cost, and cannot, therefore, be considered a poor mine; that the present engine will drain the mine for the 12 months; and that the present appearances give promise of making discoveries during that period of a valuable character.

**WHEAL ANDERTON.**—They have a splendid course of ore in the 80, worth from 90*l.* to 100*l.* per fathom; the stopes are looking well, with a splendid course, in the 60 end west.

**WHEEL SOPHIA.**—This sett is situated in Lizard, Cornwall, adjoining the old Gresson Mine, where formerly a great quantity of lead and copper was raised. Four lodes have been discovered, three running nearly north-west and south-east; the two Gresson lodes, 5 ft. big, with lead and copper in them, underlying north, the other south, and will form a junction about 50 fms. deep; also a lode due east and west, 6 feet wide, composed of strong gossan, capel, jack, &c., which is expected to form a junction with the other three, about 120 fms. west, in the adit level.

**SHREWSBURY.**—The amount of business actually transacted has not been important, but a steady inquiry is being made for some of the more favoured mines.

The inquiries for East Wheal Rose, Seton, Rough Tor, South Bassett, North Roskar, and a few others, have been kept up during the week; still we do not learn that any more than a few Rough Tor have changed hands. The accounts from Mary Ann have caused buyers, and several shares have been done

Reports received from Carwinning Hill Mine represent a progressive improvement; hence business in these shares has been renewed.

An amalgamation of Pennant with the neighbouring sett of Craigwen has created a few buyers, and some shares have changed hands.

Gwinear Consols have changed hands in rather large numbers, but not at prices which would induce us to think any great improvement had taken place, as we were advised a short time since.

Wheal Franco account meeting was held on the 14th inst. The report shows a profit of 243*l.* 8*s.* 8*d.* on the last four months. The balance in favour of the company to date of meeting, 638*l.* 18*s.*

Wheal Mary (Redruth) bi-monthly account, held last week, made a call of 15*l.* per share—balance in purser's hands, 60*l.* 12*s.* 11*d.* The agent's report represents the mine as having improved since last meeting.

South Wheal Betsey bi-monthly meeting was held on the 17th inst., but we have not received an official statement, although we learn a call of 5*l.* per 25*l.* share was made; and that they had commenced driving the cross-cut, to take the lode 40 fms. deep, which is looked to with some little anxiety.

Rhoswhiddol and Bacheeddion Mines (Wales) had their bi-monthly account meeting on the 3d inst., when a dividend of 3*l.* 3*s.* per 250*l.* share was declared—leaving a balance of 33*l.* at the banker's.

Shares in the following mines have been done this week—viz.: Devon Great Consols, South Wheal Francis, Trethellan, Herodsfoot, Trehane, Wheal Mary Ann, Gwinear, Carwinning Hill, West Wheal Maria, Pennant, Great Wheal Rough Tor Consols, Tregordan, Barriston, Tremayne, West Wheal Tolgus, Antimony and Silver-Lead Mines, West Wheal Treasury, South Trelawny, Mendip Hills, &c.

An intelligent correspondent, in a letter in last week's Journal, relating to Great Wheal Rough Tor Consols, furnishes a gratuitous and disinterested report of the proceedings in this mine—and, from the official reports which we have invariably seen, are substantially correct in the main; but, from a remark or two incidentally made in that letter, it might be assumed that information has been withheld at the office of the company: lest such an impression be made, we take the earliest opportunity of asserting, that we have at all times received the most courteous attention from those gentlemen who, holding a very large majority of the shares, have ever been ready to supply the fullest information, not only from the agent's periodical reports, but whatever could be gathered from private communications, and who, from their large holding, have been extremely solicitous in acquiring the most correct and detailed information which has been freely furnished for the guidance of the shareholders generally. The few shares which have been on the market were those of parties who, being weighed down by the ruinous effects of the late monetary pressure, were necessitated to submit to forced sales—hence the lowness of our quotations.

In foreign shares there has been considerable activity this week; and, in some instances, buyers have advanced on previous prices. The business done has been in St. John Del Rey, Bolanos, United Mexican, Copiapo, Del Monte, Asturian, Alten, Kinzingthal, Australian, &c.

Despatches have been received from the Brazilian Mines, by H.M.S. *Spy*, and from the Mexican, by the West Indian steamer *Tay*.

The St. John Del Rey letters are up to the 8th of April, and represent the mines in a most flourishing position. The profits for the month of March, as shown in another column, amounts to 283*l.*

The Imperial Brazilian letters are of antecedent date to last received, and, consequently, of no importance.

Advices from the Anglo-Mexican Mining Association are brief, but represent the profit on the five weeks' workings, ending 29th April, to be about \$192. From Real del Monte, the accounts will be found of a very unfavourable kind—and those of Bolanos somewhat interesting.

Letters by the Indian Mail represents the Bombay, Madras, and Calcutta metal markets as having much improved.

The following arrivals of specie have taken place since out last—viz.: By H.M.S. *Spy*, which arrived at Portsmouth, on Saturday, from Rio, having on freight \$35,000 on merchants' account. The Royal West India Mail steamship *Tay*, arrived at Southampton, on Tuesday evening, having on freight \$402,485 in silver, 1873 doublets in gold, 115



in endeavouring to uphold the mining interests; but we feel it would be premature to say more than that we are not listless in the cause; and that, with the exertions of those who have honestly put their shoulders to the wheel, we shall find that the old adage is rendered manifest, in good being produced out of evil.

In another column will be found a report of the proceedings of the meeting of shareholders in the NATIONAL BRAZILIAN MINING ASSOCIATION, held on Tuesday last, and at which the shareholders came, we think, to a wise resolution, in the appointment of a committee, to confer with Messrs. OXFORD and HAMILTON, as the acting directors, and whose printed statement appears to us a complete and satisfactory explanation of their proceedings, through all the difficulties and many untoward circumstances with which they have had to contend for so many years. We cannot think the position in which Mr. COLLETT placed himself, by pressing for his own election on the committee, while he is an interested party in the inquiry, his opposition to that of Mr. GREENAWAY, and his attempting to place on the committee the Messrs. REID and IRVING, knowing, from their present unfortunate position, they could not act, can have raised him in the opinion of the body of shareholders; while, from the monthly increasing returns at the mines, and particularly the one he condemns, it is clear Messrs. OXFORD and HAMILTON, as well as the agents in Brazil, have not been so ignorant of mining operations and geological experience as Mr. COLLETT has attempted to represent them.

The other charges brought forward by Mr. COLLETT we are not prepared to justify; but our opinion, which we fearlessly expressed in our last Journal, is greatly qualified by the printed explanation circulated; these, however, will, we suppose, form part of the committee's inquiries, who, we doubt not, will be most kindly received, and every information afforded; and we sincerely trust they will be able to make such a report as will be satisfactory to the body of shareholders, and tend to future amicable arrangements, and the prosperity of the association.

It will, doubtless, have been noticed by our readers the remarks which appeared in our columns of last week, touching upon certain legal matters—the results of which we expected to have had the opportunity of reporting in our columns of to-day; but whether it be that the law's delays, the indisposition of the prosecutor or plaintiff, or any compromise which may have taken place, is the cause, one thing is quite clear—we have no report to make. Let it not, however, be supposed, that these matters are to drop so quietly, or that the characters of parties are to be assailed by the public press, without an appeal to the courts of law, and we feel that such should ever be the case—inasmuch that a charge made against an individual through the medium of the press, which circulates both at home and abroad, and to which no limit can be given, should, if incorrect, be visited by a penalty—or, if that the representation can be supported and established, then submitted to a jury, who shall declare their opinion of the honesty of the expressions used—at the same time, that they may visit on the libeller, in case such be proved to be false, the penalty which shall not only preclude him from pursuing a like course, but deter others.

It is with these feelings that the MINING JOURNAL has ever been conducted; if that we are wrong, the columns are open for refutation—while we are ready to admit any error into which we may have inadvertently fallen; but where we think, at least, that we are in the right, then we declare ourselves to be ready to meet the parties, and wage a warfare upon the most friendly terms—the object of the one and other being only to do what is just.

It is almost time we should proceed to note the circumstance which has drawn from us the preceding remarks, and a few words will suffice for this object. In the Journal of the 17th inst., we did feel called upon to say a word or two as to passing events—and it so happened that, in the case under notice, we had the pleasure of communicating both with the plaintiff, the defendant, and their solicitors, as also with others; but, in so doing, it was not to be supposed, for a moment, that we should adopt the views of the one or other; our object alone was like that of the judge or jury, when the case might be submitted to them, to endeavour to elicit facts; and so far as we were concerned, by placing them before the public, to caution them as to the course they might pursue, or the parties with whom they might become associated. We do not deem it necessary to enter into detail, as regards the action referred to, as such will, doubtless, come under the consideration of a jury—assuming, as we have every right to do, that the prosecutor, or plaintiff, has good grounds for action; but it is only due to ourselves to observe, that we did not advance opinions, or statements, hastily—and should Mr. PAUL RABBY, "the younger" (for we should most distinctly wish it to be understood, our remarks did not apply to his respected father), think fit to take proceedings, as he has threatened, by his solicitor's letter, of the 19th and 22d inst., we have only to say, we shall be most ready to meet that gentleman with evidence, so, at least, as to justify any observations we may have made.

Our friends in the county of Cornwall are quite aware, that we have often endeavoured to quicken and invigorate the march of sanitary reform, whether the road traversed was provincial or metropolitan. We have looked with an anxious and desiring eye, especially on the progress of this wholesome reformation in the district spoken of, because we really take a lively interest in the comfort of its laborious population, and because we believe there is no one single measure, which it is in the power of Parliament to devise, calculated to bestow so many and such permanent advantages, as are provided for within the four corners of the Health of Towns Bill. We must, however, admit, that in most districts, we have hitherto reaped a larger harvest of disappointment than of gratification; but we sow, nevertheless, beside all waters, and cannot fail ultimately to see some of the results so much wished for springing up to the advantage and enjoyment of those in whose behalf we speak. Our disappointment has been nowhere exceeded by that we have felt at the conduct of several of the small corporations in the county of which we speak. At Truro, for instance, it has not been possible to disturb the official slumbers of those whose proper business it is to watch for, and to guard, the local interests of the inhabitants of that borough; they do all the parade duties of a corporation at Truro—but the works connected with the health of the people, as far as that depends on the cleansing of the area of the town, and the purification of its atmosphere, they have, time out of mind, and do still, leave undone. The corporation of Penzance is quite as great a sinner against all reason and duty in this particular; they have rehearsed to the life the fable of the "Dog in the Manger;" they have put themselves in the case of men who, having long worn foul linen, refused changes of fresh and clean when offered them; they were offered the best water in abundance, but they preferred keeping the worst, and not enough of it. We pity and regret their choice; we remember a happy day spent in their pleasantly situated wapentake. It is the seat, we think, of the Geological Society of Cornwall, the birthplace of Davy, and a great mining centre; and yet, in a matter of merely personal and domestic convenience, they have divorced that which is wholesome, and married themselves to that which is unclean. In Falmouth, the corporation is, as we think, more awake, and less in error, but certainly not sufficiently active for the full discharge of its local duties. With these, however, we have no present purpose of meddling; but what sanitary provision do they purpose making for the health of a population which was decimated by the eastern scourge some years since, and for the correction and control of those morbid causes,

which are indigenous to their locality? No corporation is such, in the sense of the statute, which does not protect and foster the rights and interests of those for whose benefit the corporate honours were conferred; and what interests are more prominent, or more worthy of preservation, than the domestic cleanliness and the settled health of a working population?

The general course and tone of mining transactions, since our last report, has been rather that of improvement than of deterioration; but we have not realised the advantages which we might reasonably have expected, nor has this great interest made, as yet, those decided steps in advance, which we have been some weeks anticipating in its behalf. Nevertheless, all things are ready, and every preparation is made, for the vigorous prosecution of this branch of our industry, upon the first turn of the market, affording a fair remuneration for the labour and capital with which we are everywhere prepared. The tide of bullion and specie importations continue, as our readers will perceive, full and flowing—so that that great preliminary to profitable occupation is present among us in somewhat more than its necessary abundance. Notwithstanding the great masses hoarded in the metropolis, we do not find that in the country money is so fully disseminated as the trading marts of the provincial districts seem to require. We do not know why it should not be, unless the confidence of the banking interests of London, and its other great money-holders, is not so great as to the prudence and resources of country merchants, as, in all reason, we think it well might be. It is to little purpose, that the London market is filled with money at 3½ per cent., and cannot, at that price, find customers, when money departments of our large provincial industry could pay, and advantageously pay, twice that value for the means of facilitating and enlarging their several spheres of business. We hope to see the capital of the country more generally and more equitably distributed, in order that the skill, and labour, and energy, of our whole people, may be encouraged and directed to the creation of more wealth, and especially to the end that those long sections of our population, whose whole estate is labour, may, by their labour, be admitted to those material comforts, without which there can be no domestic peace.

#### TIMBER PRESERVING COMPANY—PAYNE'S PATENT.

We were present, with a host of scientific gentlemen, on Thursday, at the works of the company, at Westminster, to witness the application of the patent, by submitting two skeleton houses, or models, to the effects produced by ignition—in the one case, the skeleton being composed of deal, or other ordinary timber; and the other, the timber employed, having been subjected to the saturating process, as described. It is set forward, that wood is, by its application, rendered not only perfectly insensible to the dry rot—if we may so express ourselves—but that it is rendered uninflammable; and, further, that it becomes seasoned in a comparatively short space of time. Such are the main features presented by the process; and, with reference to its "uninflammable" character, it is now our duty to report.

The compositions are, of themselves, insoluble, and the expense is trifling—we believe about 4d. per foot (or, say, 16s. per load), under ordinary circumstances. The appreciation in which it is held is best understood by its application on the part of Government (the process having been minutely tested by Mr. Richard Phillips) to the several works at the Houses of Parliament, the British Museum, and at the Conservative Club, Hungerford-bridge, some half dozen railways, piers, docks, &c. &c. We may here observe, that in the early experiments, conducted with the view of a complete change in the nature and properties of wood, it was found that, by the simple act of impregnating the material with solutions of metallic oxides, alkalies, and earths in various proportions, using, as a means of facilitating that operation, exhaustion and pressure, satisfactory results had been obtained, but still an objection, and that of an important character, presented itself—viz.: that of the liability to which such solutions were subject by disunion. In order, then, to overcome the drawback we find that in the case before us—that of Payne's process—such is effected by the introduction of a second solution—by a repetition whereby a new insoluble substance, "absolutely imperishable," is introduced. Wood, subjected to this process will be, it is said, proof against wet or dry rot, and the metallic properties acquired will effectually resist the attacks of insects. A still greater improvement may, however, be said to have been made in the process—that of rendering timber uninflammable.

Having said thus much as to the peculiar objects of the patent, we shall at once proceed to report on the conflagration of Thursday, closing our notes with some general observations touching on the subject. On visiting the yard and wharf of the company, we found two houses, or skeletons, prepared for fixing, on the strand, or beach; the one and other was, so far as the eye would allow, about 4 ft., or 4 ft. 6 in. square, and about 6 ft. to the apex of the roof; two baskets, or in weight 7 lbs., of shavings were introduced into each of the skeleton houses, and ignited. In the one case, with the unprepared timber or wood (it being, except the rafters, about 2 in. or 2 in. plank), a few minutes perfectly satisfied those present that the effect had been fully produced; for, in a short time, the walls, the roof, the floor, indeed all was consumed, but the more solid timber of which the frame was constructed. In the other instance, the shavings were consumed, and the smoke emitted through the apertures by the doors and windows, but no evidence afforded of its action on the wood, if we may except a certain exudation, which we take to be turpentine, but which, it is somewhat curious to find, does not ignite.

It being thus rendered clear, that the quantum of fuel placed in the two several buildings, or models, had so determined an opposite effect—in the one case the building being demolished by the action of fire, while in the other no effect was produced beyond the emission of smoke—a second charge was placed in the prepared establishment, and it burnt out without in any way affecting the material. As an evidence of this, we brought away with us a plank, which will at once illustrate the effect produced. Some other instances were presented to us of the beautiful polish which woods, saturated on this principle, acquire; and an interesting evidence was afforded of the difference presented by wood having undergone the process, and otherwise which we will present to our readers, with other more minute details, in our next Number.

These patents, obtained on the inventions of Mr. Payne, have lately been invested in a company who appear determined that their value shall not only be more known, but their qualities tried by experiments. Our readers may form some idea of the durability of timber impregnated with metallic oxides, from the fact, that the only portion of the Royal George, the Edgar, and the piles of Old London Bridge, found to be sound, were those impregnated with oxide of iron and a calcareous matter, imbibed from the sea water, whilst the remaining portions were either destroyed or rotted.

The process under notice consists in introducing, by means of exhaustion and pressure, such metallic and earthy solutions as shall, by single and double decomposition, form new and insoluble salts throughout the interstices of the wood. For ordinary purposes, in the first instance, a solution of sulphate of iron, and then one of muriate of lime, are injected; these, by double decomposition, form sulphate of lime (insoluble) and muriate of iron. When the timber is required proof against ravages of worms, sulphuret of barytes and sulphate of iron, or of alumina—both or either of the latter—are injected.

The great advantages consist in preserving timber from wet or dry rot, ravages of worms, and combustion; it also renders wood as much seasoned in as many months as, under ordinary circumstances, it would be in as many years.

Another most valuable property attending this process, is that of rendering the inferior, and, consequently, cheap, colonial and home growth wood equal to the oak, but made to partake of metallic qualities, even more lasting than the timber which at present exceeds it threefold in price. Wood so prepared, even deal, becomes susceptible of the finest polish; and, moreover, by the use of certain solutions, can be stained throughout with every variety of colour. The process has been in operation five years, and nothing proves its efficacy more completely, than that those parties who used it, in its early stage, are now using it on a very extensive scale.

**LOCOMOTIVE CARRIAGE ON TURNPIKE ROADS.**—The propulsion of carriages and other vehicles on common roads has long been a great desideratum, and has for a considerable time employed many highly-intelligent and inventive minds. Among these, Sir James Anderson has persevered for many years in endeavours at perfection, at the cost of a fortune; but he has at last, we hope, produced a machine, which will solve the long discussed problem. It is certainly no argument against the possibility of the thing, because it has not yet succeeded; and though there have hitherto been unsurmounted difficulties, we think, in the present instance, they will have been entirely removed. The great difficulty has hitherto been in the construction of the boiler—it being necessary to have such a disposition of its parts as would rapidly produce the most dense steam, combined with such strength as permanently to resist the most intense pressure, and all possible external collision, while the machinery should be so arranged as that the concussion and agitation of the common roads should not operate upon it prejudicially. Sir James Anderson has, he believes, succeeded, at length, in producing such a boiler. The other parts of the engine are simple, but powerful; and we understand it is expected to run on the Hounslow-road in about three weeks, when we hope to be able to give a report of its successful performance.

**ELECTRIC DEPOSITION OF METALS.**—The magnetic process of the late Mr. Woolrich, which was patented about five years ago, is, we believe, now universally allowed to be superior to every other. Mr. J. S. Woolrich, the son of the patentee, carries on an extensive business in plating for the trade, at St. James-street, St. Paul's, Birmingham. The advantages of the magneto-plating are briefly these: The metal deposited is perfectly smooth, and the adhesion between it and its base so firm, as to be capable of standing a red heat without sustaining any injury. The silver may be deposited of any required degree of softness or hardness. And so also the quantity of silver put on the goods may be ascertained to the greatest nicety.—*Mechanics' Magazine*.

**EMIGRANT SHIPS.**—Our correspondent (Mr. Martin, of Penzance) informs us, that an emigrant ship from Ireland, bound for Boston, has been run back to Penzance, after having been at sea three weeks, nearly waterlogged. It appears that the vessel had been, some 15 years since, a Falmouth packet; and that, before the last voyage, the copper had been stripped off. Of course, the copper was not removed in anticipation of the loss of vessel and living cargo of 60 persons, as this would be over indicative of financial economy; but, at all events, it appears to be a proceeding which requires explanation.

#### ELECTRICAL PHENOMENA—LIGHTNING AND THUNDER.

At the Royal Polytechnic Institution, on Monday last, Mr. Isham Baggs commenced a course of lectures, to show how all the various sensible manifestations of the action of the electric fluid in Nature can be imitated by art, and thus, by inductive reasoning, we arrive at a proximately correct knowledge as to their cause. We attended one of the lectures during the week, with much gratification. Mr. Baggs is evidently theoretically and practically well read and experienced in the deep intricacies of this abstruse science; his address is easy, his language highly intelligent and conversational, and we think he bids fair to become a favourite public lecturer. He commenced by observing that, from recent discoveries, he had formed some conclusions on the nature of thunder, and the cause of lightning, which he would, after some general observations, endeavour to explain. In the first place, for the information of that portion of his audience who might not be acquainted with the subject, he described the means of developing the electric fluid by the common plate machine, drawing a spark by the knuckle from the prime conductor, filling a Leyden jar, &c. He then observed that this fluid was absolutely ubiquitous; it pervaded all Nature; there was not a spot of ground, not an atom of matter, which did not teem with it; and Professor Faraday had discovered that a single drop of water contained sufficient electric fluid, in a latent or hidden form, to charge the large battery of the institution, to its maximum of intensity, 400,000 times over. If such was the case with a single drop of water, what must be the contents of the entire globe?

In addition to its abundance, it was also measured out in the greatest neatness to all substances, according to their chemical combinations and affinities, and its activity was intense and constant—the stirring of a leaf, the decomposition of an ultimate atom of water, liberated a portion of the fluid, to take effect on surrounding substances. This he showed by two pieces of gold leaf in a receiver, which, by the mere friction of whisking the top plate with a warm cloth, immediately repelled each other, their lower ends being 3 inches apart.

Mr. Baggs then proceeded to describe Armstrong's steam electrical machine. It consists of a large boiler, completely insulated, by being supported on glass pillars, and the chimney, which passes through the roof, consisting of two separate pieces—the upper one capable of being raised. It is provided with a number of jets along one of its sides, allowing, on opening a valve, a powerful rush of steam against a series of metallic points, by which a large portion of electricity is evolved, and conducted to any apparatus required. In making experiments in frictional electricity, the greatest caution was necessary in keeping everything free from moisture, and also from dust. The latter he represented by a number of pitch balls in a glass receiver, covered by a metallic plate; and, on connection with the prime mover, they were attracted and repelled with great velocity, flying about in all directions; this proved that where dust was suffered to accumulate, such re-action among the particles of matter destroyed the equilibrium of the current. Further, to show this repulsive power of substances, similarly electrified, a rod, about 12 ft. long, was raised, having at the top a bunch of long strips of dry paper, and surrounded by a spiral of tin-foil, to connect it with the conductor. On the admission of the current, the slips of paper stood out in all directions, assuming the form of a fountain.

The lecture next explained the various manifestations of the electric fluid in Nature—the electric spark or glow, meteors, the aurora borealis, and, lastly, lightning and thunder. The former had been seen in all ages—sailors often saw it on the mast-head, sometimes in a stream 6 or 7 ft. high; it was noticed by the Roman soldiers on the points of their spears, as recorded by Julius Caesar in his *Commentaries*, and had been imputed in the darker ages to the approval of guardian saints; it was known to the Italians as the fire of "St. Peter" and "St. Nicholas," and to the French as that of "St. Elmo;" it was employed at the latter fortress to foretell storms; in a highly electrified state of the atmosphere, on touching a metallic ball with a bayonet's point, a spark was given off, more or less intense. With respect to meteors, he considered they were sometimes attributable to imponderable electricity, and sometimes to the explosions of nebulous matter floating in planetary space. In 1783, one was seen giving out a most intense light, and the report of which was heard at Windsor 10 minutes after exploding, which would afford some idea of its disruptive power and immense distance. One was on record, which simultaneously illuminated, for hours, almost the entire of the North American continent, and of such brilliant intensity that the negroes fell on their faces, calling to Heaven for aid, thinking the world was on fire. He next described the aurora, which was the effect of numerous discharges of electricity in very elevated regions of space; and the direction of whose motion appeared to be pointedly related to that of the magnetic meridian.

Dalton recorded one calculated at 500 miles long, 7 or 8 broad, moving at the rate of 20 miles per second. The production of imitations of lightning, the aurora, &c., in tall exhausted receivers, was very correct and brilliant, and received with much applause. To show that thunder was not the rumbling echo of one discharge of electricity, but an almost simultaneous discharge of number of charged portions of a thunder-cloud, 18 Leyden jars, placed horizontally on pedestals, were charged, and so arranged that they could be instantly connected together in one complete battery, when the eye could detect the fact, that each jar discharged itself distinctly, giving out the spark in a combined stream of light, accompanied by a loud report. The brilliant and accumulated flash of lightning thus produced was caused to strike through a direct and uninterrupted interval of atmospheric air—at least, equal to 3 ft. in length; and, to imitate the effects of lightning in a pleasing manner, it was made to impinge at its termination on a small magazine of gun-cotton—the explosion of which added considerably to the effect. The flash so produced can be extended to any length required, even though 20 or 100 ft.

In charging the series of Leyden jars, a very beautiful little apparatus, the invention of Mr. Baggs, was employed for conducting the superabundant fluid into the earth, without diminishing the intensity of each charge below a given point: it consists of two fixed brass balls, placed vertically, about 3 inches apart—the lower one in connection with the earth. Between these another ball is placed, on the end of a lever, with a counter-balance, by which it can vibrate between the two. While the Leyden jar is being charged, the fluid is seen to stream in brilliant light to the middle ball; but, immediately on being fully charged, the vibrating ball is repelled downwards, and the electricity is visibly conducted to the lower ball, and thence to the earth. A new and beautiful experiment was also performed, by discharging a leaden bullet from an air-gun, between two brass balls, charged with electricity. On arriving between the balls, it is near enough to each to elicit a brilliant spark, when the ball is distinctly seen *in situ*, as if for an instant stationary, although it has instantaneously penetrated a ½-inch deal board, at a short distance beyond. Mr. Baggs concluded with some general observations, on the importance of a correct knowledge of the science, as he had no doubt that every phenomena in terrestrial physics could be accounted for on electrical principles. The whole of the lecture gave every satisfaction to a full and highly-respectable audience.

#### PROGRESS OF TELEGRAPHIC COMMUNICATION.

Great as have been the advantages from the introduction of galvanic electricity to telegraphic purposes, there is yet a wide field open for improvement in many of the details. Signals are imperfectly understood, and many errors occur in reading off communications made. Mr. Francis Whishaw, who was 12 months officially employed by the Telegraphic Company, has, for some years, paid a vast deal of attention to the simplification of the codes of signals, many plans of which he has perfected. We had the pleasure yesterday of inspecting at that gentleman's offices, a new hydraulic telegraph, which can be worked, with either circular or horizontal dial-plate; an air, or speaking, telegraph, a beautiful arrangement, attached to a chronometer, for ascertaining and reading off at sight, the speed of trains, or other fast-moving bodies, with several other important inventions and improvements connected with telegraphic communication. His code of signals is certainly highly ingenious. The letters of the alphabet are placed on two sides of a square—the left-hand column and the top line—and lines are drawn through the spaces intersecting each other, and forming 676 compartments, in each of which is written a word, sentence, sum of money, or weight, or any other signal which may be agreed on.

By employing the letters—roman and italics, capitals and small letters, and printed in black, green, blue, &c.—an innumerable quantity of these codes, of 676 signs in each, can be produced they are most simple and easy to understand—thus the compartment, where B and k intersect, may be "1000Z," or "the 10 o'clock train has started;" L and P may be, "send an express train," or "73 tons," and thus in endless variety; and, by having each numbered—as code 1, code 2, code 3, &c.—it would be scarcely possible to make a mistake so common in spelling signals. On his circular dials, he employs three hands, having as many alphabets in circles, with circle of figures, &c.; and over which is placed, in another circle, a variety of questions, usually asked, day after day, with appropriate answers. Other removable codes are, ready for various trades—as coal, timber, iron, &c. The hydraulic telegraph is entirely on the principle of water finding its own level, and acts in the model exceedingly correct. The air telegraph consists of a coil of pipe of gutta percha, 200 ft. long, through which a whisper can be heard perfectly distinct; and, during the experiments, which have been followed up by Mr. Whishaw, he has ascertained that a speaking telegraph of this description would most probably prove effectual on a length of several miles. A tune can be played on a flagstaff at one end of this 200 ft. tube, by blowing at the other just as the wind is blowing into the mouth-piece. For communication between driver and guard, he conveys one of these along the train with a whistle at one end, which calls the attention of either of them—the whistle unscrews, and they can then converse and ascertain when danger occurs. The whole of the various codes of signals, and methods of communication, can be employed on any kind of electric, or any other description of telegraph.

## NEW MACHINE FOR TESTING CHAIN CABLES.

Messrs. Dunn and Elliott, of the Windsor-bridge Iron-Works, Manchester, have lately invented a machine for testing chain cables, which is distinguished by great simplicity in its arrangement, and by which some important objects are more completely attained than by any previous invention. The machine has been expressly made for Messrs. Hingley and Sons, of the Cradley Chain Works, Worcestershire, and of Salthouse Dock, Liverpool. Hitherto those gentlemen, and other chain cable manufacturers, have not possessed on the spot a sufficiently powerful testing machine; and if their cables broke when tested at Liverpool, they suffered all the cost of the carriage of the cables thither, and the expense of repair. This disadvantage is now obviated, and a perfect test of each chain will be made where the article is manufactured. Messrs. Dunn and Elliott's machine was tried at their works (the Windsor-bridge Iron-Works), previously to its being sent to its destination, in the presence of Mr. Fothergill, of the firm of Roberts, Fothergill, and Dobinson; Mr. W. Mayburn, of the Ardwick Iron-Works; Mr. Barlow, consulting engineer; Mr. Booth, manager of Messrs. Whitworth and Co.'s works; and other engineers and machine makers. The opinion of these gentlemen was highly favourable to its merits. The machine in question consists of a horizontal iron cylinder, 6 ft. long, in which works a piston. At the end of the cylinder, and continuing in the same right line, is an iron trough, or pipe, which may be lengthened or contracted at pleasure. At the end of this trough are a pair of iron claws, to which one end of the chain to be tested is fastened; the other end of the chain is fastened to the end of the piston-rod, by similar claws. The chain being thus fixed, is tested in the following manner:—Water is forced by a double hydraulic pump into the cylinder, between the bottom of the piston and the water-tight end of the cylinder next to the trough, which, of course, forces the piston to descend the cylinder, stretching and severely testing the chain, one end of which is attached to the piston-rod. The advantage of testing the chain by means of a hydraulic pump, over any other means of testing hitherto adopted, is that a more gradual and constant increase of pressure is obtained; and that, on account of the slightest elasticity of water, there is not the severe rebound which on other arrangements takes place when a heavy chain is broken at a very high pressure, and which is sometimes attended with serious injury to the testing machinery, and with dangerous accidents to the bystanders. The trough by which the chain is being tested is shut in, which is a further precaution against accident. The adaptation of the hydraulic press to the purpose in question was not, however, a novelty. The peculiar advantage of the new machine is the combination of the hydraulic press with a simple and effectual contrivance for accurately registering the pressure exerted upon the chain, which we shall now describe. At the end of the cylinder, next the trough, and in its upper surface, is fixed a brass ram, working in a water-tight stuffing-box, and having its upper end connected with a scalebeam. The scalebeam, of course, rests on a support fixed upon the machine. When, therefore, the water is forced into the cylinder, the ram, it is clear, must be driven upwards, lifting the scalebeam with it; and, by fixing different weights upon this, or sliding the same weight nearer or farther from the fulcrum of the beam, as on a steel-yard, the intensity of the pressure can be accurately measured. The gradual increase of weight arising from sliding the weight along the beam, combined with the gradually increasing pressure from the hydraulic press, gives, it will be at once seen, a total freedom from jerking, or from sudden straining in the testing. In order to get rid of the necessity of entering into minute calculations, as to the effect of the weight of the scalebeam, or the friction of the ram in the stuffing-box, the scalebeam is lengthened beyond the pivot, its two limbs being made to balance; and upon the limb on which the ram does not act, and upon which the testing weight or weights are not placed, a small weight equal to this friction is placed. In the cable-testing machines to which the hydraulic pressure has hitherto been applied, the lever for measuring the pressure has been annexed to the pump; and consequently one most important element in the calculation, the friction of the water in the pipe from the pump to the cylinder, and in the cylinder itself, has been totally omitted, or, at all events, has not been measured with the slightest approach to accuracy. The weight of the whole machine, not including the trough, is about 3 tons, its width about 5 ft.; the length, of course, is variable, depending upon the length of the chain which is being tested. It is capable of testing with any pressure from  $\frac{1}{2}$  cwt. to 100 tons; its cost is only about 200*£*. The corporation machine at Liverpool, whose testing power does not exceed that of Messrs. Dunn and Elliott's machine, cost 1000*£*, and is about six times the weight, and three times the bulk of the machine we have been describing.

The above machine has been proved at the Cradley Chain-Works, in the presence of Mr. C. Evers, of the firm of Messrs. S. Evers and Sons, Cradley Iron-Works, and other gentlemen in the neighbourhood, to their great satisfaction. A chain cable, 30 yards long, made from 13 rounds of the regular quality of cable iron, by S. Evers and Sons, bore the extraordinary weight of 78 tons, being 28 tons above the regular proof required at Lloyd's, and stretched 4 ft. in length before it could be broken, the power of the machine literally dragging the iron asunder.—*Birmingham Journal*.

**RAILWAY BRIDGES.**—The falling of so many of these structures, and the burning of that at Newport, for the South Wales Railway, involves a question as to which is really the best mode of construction. It appears the South Wales Bridge, under the auspices of Mr. Brunel, is to be again built of the same material as before—viz.: timber rendered inflammable as gunpowder, but which is now to be plastered over with some incombustible material. Now we think it cannot be claimed for us, as a nation, that our engineers adopt, in every case, plans founded on the trust mechanical bases; but, in numerous cases, we have seen enormous structures, and immense iron girder bridges, absolutely crushed into ruins by their own unwieldy weight; while lighter structures, but possessing large mechanical power, have been entirely passed over. Among the many descriptions of bridges which we have had occasion to notice, we know of few which combine the elements of safety with lightness and economy as that under Rider's patent, and which, though of American origin, is well deserving consideration. These bridges are constructed on the principle of employing the least quantity of metal compatible with safety, and making, in mechanical strength, what is lost in bulk of material. The model, which we some time since inspected, 4 ft. 6 in. long, weighing 12 lbs., has supported shot, in bags, weighing 1500 lbs.; one 40 ft. span, weighing 44 tons, has borne, we are informed, 50 tons; and a railway bridge, with a double track, on the New York and Harlem line, weighing 18 tons, has heavy trains passing over it every day, without sensible oscillation or vibration; and, to test the methods employed of allowing for expansion and contraction, the two last named ones have been exposed to temperatures varying from  $110^{\circ}$  to several degrees below zero.

**REMARKABLE RAILWAY BRIDGES ERECTING.**—The following description of the railway bridge over the Tweed now in course of erection, is given by Mr. Harrison, the resident engineer under Mr. Stephenson. This bridge is to be of stone, and is to consist of 28 semicircular arches, each 61 ft. span, resting on lofty piers, carrying the level of the railway 108 feet above high-water mark, 126 feet above low-water mark, and 135 feet above the deepest part of the bed of the river. The whole length of the bridge, with abutments and wing-walls, is 2140 ft. The 28 arches are divided into two series by a broad pier, 28 ft. in thickness in the middle. The piers of the arches are 8 ft. in thickness at the springing, increasing by steps towards the bottom. The bridge will not be completed for 16 or 18 months, but it is intended to have a temporary bridge ready for traffic in the month of July next. This viaduct is a work of great magnitude, and will form, when completed, a striking and imposing structure, and one of the many to which the extension of railways has given rise. Another remarkable work is the viaduct over the valley of Dunglass, between Dunbar and Berwick, not far from the once celebrated Pease-bridge. This viaduct crosses the valley and banks by six semicircular arches, each 60 ft. span, and then the deep ravine by a single arch, 135 ft. span, and rising 150 feet above the bed of the stream. The third viaduct is that of Ballochmyre, across the water of Ayr, on the Cumnock extension of the Ayrshire Railway, and is similar to that of Dunglass in crossing the valley on three semicircular arches, each 50 ft. span on each side, but is still more remarkable in crossing the deep ravine in the middle by a single semicircular stone arch, no less than 180 feet span, and rising 150 feet above the bed of the stream—a bold and noble design, which has been executed with complete success—the adjacent rocks furnishing such vast blocks of stone as greatly to facilitate the construction, and to render, indeed, the plan itself practicable. The arch stones are 5 feet 3 inches deep at the springing, and 4 feet 9 inches at the crown, and the appearance from below of the stupendous arch arising to such a height is singularly grand and striking.

**IMPROVEMENTS IN THE ROTARY STEAM-ENGINE.**—A patent has been secured by Mr. Kinsman, of Ludgate-hill (being a communication from America), for a new description of rotary-engine. It consists of what the inventor calls a "piston-wheel," being a wheel on which are placed any number of pistons, formed radially from the centre of the piston-wheel, and being tangential curves, working steam-tight against the inner circumferences of the cylinder. Around the periphery of the cylinder there are openings, being one less than the number of pistons, in which slide stops, which pass into the cylinder—the ends of which bear against the periphery of the piston-wheel, and render that portion steam-tight. The peculiar form of the pistons enables the stops gradually to recede from the interior of the cylinder, until they become flush with the surface, and thereby allow the pistons to pass them without obstruction. Immediately a piston has passed a stop, it is again projected into the cylinder, to act as a surface, against which the steam propels the piston-wheel forward.

**KAMPFLUXON.**—We understand that on Thursday last, workmen in the employ of the patentees of this composition commenced paving the court-yard of the Admiralty with it; it is laid down in cakes 12 in. square, and 1 in. thick; it deadens all sound of the horses' hoofs and carriage-wheels, and has been long successfully tested at Windsor Castle, and many mansions of the nobility and gentry. It is getting into extensive use for stables, and the quadrangle in front of Buckingham Palace will be paved with it, when the new wing is complete.

## Proceedings of Public Companies.

## MEETINGS DURING THE ENSUING WEEK.

MONDAY.....	Nister Dale Iron Company—offices, at One Bank of Australasia—offices, at One.
	Louvain à la Sambre Railway—Bull and Mouth Tavern, at Two.
TUESDAY.....	Galvanised Iron Company—London Tavern, at One.
	Norwich Union Reversionary Interest Company—offices.
	South Australian Banking Company—offices, at One.
WEDNESDAY .....	Grand Junction Canal Company—Crown and Anchor Tavern, at Twelve.
	South Australian Company—offices, at One.
THURSDAY .....	Marine Assurance Company—offices, at One.
	Grand Western Canal Company—London Tavern, at Twelve.
FRIDAY .....	British Commercial Life Assurance Company—offices, at Six.
	Provident Clerks' Assurance Society—London Tavern, at Six.
	Asturian Mining Company—offices, at Two.

## TAVY CONSOLS MINING COMPANY.

At a two-monthly meeting of adventurers, held at the Central Hall, Plymouth, on the 13th inst., the accounts were examined and passed, showing—Balance from last account, 19*£*. 8*s*. ; labour cost, March and April, 452*£*. 6*s*. 8*d*; lord's dues, 60*£*. 8*s*. ; merchants' bills, 112*£*. 9*s*. 10*d*.—together, 644*£*. 7*s*. 6*d*. By ores sold, 623*£*. 19*s*. 5*d*.—leaving balance against the mine of 20*£*. 8*s*. 1*d*. The thanks of the meeting were passed to the committee of management, and the same gentlemen appointed for the next two months. The following report from Captain Goss was read:—

*June 12.*—Since the last general meeting the engine-shaft has been sunk about 4 fms., where the lode has been dislodged by a slide, or branch, that intersected it; but, as we go down, the slide appears to be leaving the shaft again, and the lode appears to be coming in a more settled state, producing good stones of ore—sinking at 15*f*. per fm. The 36 fm. level has been driven about 4 fms., on a large lode, composed of spar, pencil, and mudic, with spots of yellow ore, but not rich enough to save—driving at 6*f*. per fm. The 24 fm. level has been driven about 7 fms., the lode being about 3 ft. big, composed chiefly of spar and mudic, with spots of yellow ore; but here there is a change taking place—the spar appears to be cutting out, and pencil, and good stones of ore, of a very promising appearance, coming in its place—driving at 5*f*. per fm. The 20 fm. level has been driven east of the engine-shaft about 3 fms.; the lode here is from 3 to 4 ft. wide, producing better than 2 tons of ore per fm., and driving at 3*f*. 10*s*. per fm. The winze in the bottom of the 12 fm. level has been sunk about 2 fms.; the lode here is from 4 to 5*f*. wide, saving work—sinking at 5*f*. 10*s*. per fm. In the pitch in the bottom of the shallow west, adit, west of the cross-course, there is a very good lode. The ore appears to be dipping west, and as we extend away the lower levels, no doubt we shall meet with the same quality of ore. The other pitches are much the same as when reported on last. We sampled at Gawton, May 31, 53 tons 7 cwt. 2 qrs. of ore, and hope to have about the same quantity for the present month.

## WHEAL FRANCO MINING COMPANY.

At a general meeting of adventurers, held at the mine on the 14th inst., JOHN RUNDLE, Esq., in the chair,

The accounts were examined and passed, showing—Balance of cash at last meeting, 390*£*. 9*s*. 4*d*. ; ore sold in four months ending June, 2676*£*. 1*s*. 4*d*.—30*£*. 10*s*.—By labour cost for four months ending May, 2432*£*. 1*s*. 8*d*.—leaving balance in favour of adventurers of 633*£*. 1*s*. ; from which deduct above balance, 390*£*. 9*s*. 4*d*. , showing profit in the last four months of 243*£*. 8*s*. 8*d*. It appears, by the committee's report, that much greater profit would have accrued, but from the low rate of the standard, and that the works generally have been regularly prosecuted. The following report from the agents, Captains Edwards and Lean, was read:—

*Wheal Franco*, June 14.—In laying our report of the proceedings of this mine before you, we beg to say, that since the last meeting the 62 fm. level cross-cut, south from Boswara's engine-shaft, has been driven about 6 fms. in the capes of the lode, but the leader part is not yet intersected. In driving through the capes, several branches of fluor-spars and quartz have been intersected, producing some good stones of ore; branches similar to these, but without ore, were seen in the 47 fm. level cross-cut, to the north of the leader part of the lode. It is quite out of our power to give an opinion as to the time it will take to cut the leader part of the lode, as there is a very great variation in the thickness of the capes in the different parts of the mine. The 47 fm. level west has been driven about 8 fms., and has intersected another cross-course, on which it is now being driven, to cut the lode on the western side of it. From the cross-cut home to this cross-course we have had a large ore lode, although not rich; the 47 fm. level, east of the cross-cut, has been driven about 13 fms., through a large kindly lode, composed of fluor-spars, quartz, and ore, of a good quality. The winze in the bottom of the 32 fm. level, west of Boswara's, has been sunk 3 fms., through a good lode. This winze is going down 20 fms. west of the present end of the 47 fm. level, between that end and the great western cross-course; and as there has been but little ore produced west of Boswara's shaft, above the 32 fm. level, and as the lode in this winze is taking a more perpendicular direction, as it did in the old mine below that level, we think we have good grounds to hope for a good lode in this part of the mine. The winze in the bottom of the 32 fm. level, east of Boswara's shaft, has been sunk nearly to the 47 fm. level—it has produced some saving work; the same level, east of Spy's shaft, has been driven about 5 fathoms, the lode throughout has been large, hard, and poor, until within the last 6 fms., where it has intersected what we believe to be the eastern cross-course; here the lode and cross-course are running parallel to each other, and the former is much improved, yielding at present tolerably good work. The adit level, east of Burnell's shaft, has been driven about 20 fathoms, and we expect there are from 20 to 30 fms. more to drive to intersect the cross-course. Had it not been for the present very low standard of copper ore, there would have been but very little alteration in our tribute department; but, under present circumstances, several of the pitches that would have been yielding profitable returns, will not pay for working; and we fear, unless there be an improvement in the price of ore, we shall but barely pay the expenses of the mine. A new lobby has been commenced, for the purpose of giving greater power to our machinery. It will be about 560 fms. long, 110 fms. of which have been driven. When completed, it will give a fall of 35 feet.

## WHEAL MARY MINING COMPANY.

At a meeting of adventurers, held at the mine, on Wednesday, the 14th inst., the accounts were examined and passed, showing—Balance at last meeting, 20*£*. 18*s*. 6*d*. ; by 6th 15*s*. call, 74*£*. 10*s*. ; copper ore sold (less 1-18th dues), 280*£*. 1*s*. 11*d*.—11*£*. 1*s*. 5*d*.—Costs for March and April, 699*£*. 6*s*. 9*d*. ; merchants' bills, 41*£*. 10*s*. 9*d*.—leaving balance of 60*£*. 12*s*. 11*d*.

The following report, from Captains Paul Rabey and Chas. Andrawartha, was read to the meeting:—

*Wheal Mary*, June 14.—Since our last account we have forked the mine to the bottom, cleared up the level, divided down and planted the shaft to the bottom, and fixed our plunger-lift, and are now driving the 80 fm. level west, by six men, at 15*f*. per fm.; we have driven about 9 feet on the south side of the lode, being prevented from carrying the whole lode, in consequence of its letting out so much water. The lode had been driven on about 28 fms. by the former adventurers in this level; and when we resumed it, it was about 6 inches big; it is now from 6 to 7 feet big, composed of spar and fine stones of ore, and looking very promising to make a course of ore in a few fathoms driving. We are also driving a cross-cut south, in the same level, by six men, at 10*f*. per fm.; to cut the middle south lode, this is driven about 6 feet, and we expect to intersect the lode in the course of next week; in driving this end we have intersected a branch of ore and spar, passing with Wheal Mary lode to this lode, which we think a favourable indication: these lodes will, in all probability, form a junction at a few fathoms under the 80. The 70 fm. level is driving west, on Wheal Mary lode, by four men, at 8*f*. per fm.; the middle south lode, in the 70 fm. level, east and west, by six men, at 3*f*. 10*s*. per fm.; and, to west of the 70 fm. level, west, by four men, at 8*f*. per fm.; the lode west is about 2 ft. wide, and will produce about 2 tons of good ore per fathom; and east, about 1 ft. wide, and will produce about 1 ton per fathom; these ends look very promising, and will lie good tribute grounds. The 40 fm. level, on the same lode, is being driven east, by three men and three boys, at 3*f*. per fm.; the lode is about 14 i. wide, with stones of ore, but poor. The 40 fm. level cross-cut north is being driven by six men, at 4*f*. 10*s*. per fm., to cut Wheal Parent lode, which we expect will be accomplished in 6 fms. more driving; this end has been driven 45 fms. The cross-cut south, in the same level, is driving by six men, at 5*f*. per fathom, in good lads ground, with a small cross-course in the end, and letting go a little water; this end has been driven south about 45 fms., and we may expect to intersect the south lode in about 12 or 15 fms. more driving. We are sinking Chadwick's shaft, below the 12 fm. level, on Wheal Parent lode, by six men, at 5*f*. per fathom; the lode is about 2 ft. wide, and will produce about 2 tons of good ore per fathom; this lode has steadily improved in sinking. We are also rising in the back of the 12 fm. level, on the same lode, by three men and two boys, at 3*f*. per fathom, for air; the lode is about 2*f*. wide, composed of spar, with stones of ore. We have five tribute pitches working in different parts of the mine, averaging about 10 tons in the 17*f*. from the depressed state of the standard, we are prevented setting more with advantage. We have also ten men and three boys, working in different levels, on silver ore, and are raising about 3*f*. tons of that ore per month. On the 19th May we sold, by ticket, to the Tamar Smelting Company, 63 cwt. of silver ore, at 4*f*. 11*s*. 6*d*. per cwt., payable in the usual course, by three months' bill. We shall also sell, on the 23rd inst., about 5 tons of ore, of a similar description, but of a less produce. We calculate on sampling, at our regular time, from 40 to 50 tons of copper ore. On the whole, the mine is looking much better than at the last account, with every prospect of further improvement; and our future costs will be much less on materials than they have hitherto been.

## WHEAL TREMAYNE MINING COMPANY.

At a two-monthly meeting of adventurers, held at the offices, George-yard, Lombard-street, on the 16th inst.—Mr. N. PAINTER, in the chair—the accounts were examined and passed, showing—Labour cost for March and April, 15*£*. 2*s*. 7*d*. ; merchants' bills, 538*£*. 10*s*.—20*£*. 1*s*. 5*d*.—By sale of copper ores, 42*£*. 1*s*. 5*d*. ; black tin and arsenic, 150*£*. 1*s*. 6*d*. ; sundries, 22*£*. 1*s*. 6*d*.—leaving balance against the mine, 14*£*. 1*s*. 8*d*. : to which add balance last account 494*£*. 9*s*. 2*d*.—shows a total against adventurers of 636*£*. 7*s*. 2*d*. It was resolved, that the purser apply to the lords to forego their dues during the depressed state of the standard for copper ores and low price of tin.

The following report from Captains Blewitt and Phillips was read:—

*Wheat Tremayne*, June 13.—The lode in the 80 fm. level, east of engine-shaft, is 1 ft. wide, producing rich stones of grey copper ore—a very promising looking lode: the lode in the 80 fm. level, west of said shaft, is poor at present; the lode in the 80 fm. level, west of flat-rod shaft, is 10 in. wide, producing stones of copper ore, we expect to raise in two months from the back of this level, 50 tons of ore of good quality, the tribute for raising the

## Original Correspondence.

## POLAR FORCES AS APPLIED TO GEOLOGY AND MINING.

SIR.—I observe, in a letter from a correspondent, "T. R." in your last Number, a notice of the report of one of my lectures, as published in the *Mining Journal* of the 18th March last. I have no remark to offer at present on the general subject under discussion, as I have already, in my work on geology, published in 1844, stated, in as few words as possible, my view of the then state of knowledge on the subject of mineral veins, and the credit due to Mr. Evan Hopkins among other observers—(see vol. ii, p. 278). My object in writing now, is to disclaim any pretension to a new theory, or polar-force theory, as your correspondent might very reasonably suppose I had put forward on the occasion of these lectures. To say nothing of the extreme improbability, that I should have selected such an opportunity as lecturing to a class of college students, to promulgate speculations concerning one of the most difficult and obscure subjects in modern science, I would only observe, that I endeavoured to collect into a group the various facts that had been observed, and the explanations offered, and then stated my own impression of their relative value, and of the most useful practical combination of the various theories. This was new in one sense, being my own combination, and, more than this, I did not mean to infer. I beg to say in conclusion, that I am in no way responsible for the headings of these lectures, as published in your Journal, never having seen them (the headings) till after publication. As in the body of the lecture no claim whatever is made to originality, I did not think fit to trouble you with a disclaimer of the title at the time, more especially as I had had an apology at the very foot of the lecture in question. Perhaps, it may be satisfactory to your correspondent to know, that my mining pursuits are not altogether confined to the study and the lecture-room.—D. T. ANSTED: Gloucester-road, Hyde Park, June 12.

## NOVA SCOTIA ORE—MANUFACTURE OF STEEL.

SIR.—Mr. Radley appears to slight the quality of the Nova Scotia iron ore, which is of unusual purity; and he asks, why English capital should be drained away to work these mines, when specimens of ore equally pure can be picked up at home? As to purity, the bulk of the ores of iron used in England are so impure as to average in 100 parts:—Earthy matter (clay, lime, sand, &c.), 40; volatile matter (water, carbonic acid, &c.), 27; iron, only 33 = 100. Of the richer and purer ores, the spathose ores of Weardale do not in any case exceed 44 per cent. The Cumberland and Lancashire haematises do not in the bulk exceed 50 per cent. produced in iron, with a large admixture of clay-sand, and not unfrequently pyrites. The magnetic ore found on the property of Sir T. Lethbridge, is so largely and intimately mixed with quartz-rock of the most refractory nature, that the ore when taken, on an average, will barely yield 50 per cent. of iron—whilst of 100 tons, which I melted up, it would have been impossible to have selected 5 cwt. of absolutely pure oxide; and a good deal of pyrites was sprinkled throughout the lumps.

I have also seen specimens of micaeous specular ore from mines in Devonshire, which, to all outward appearance, were equal to the Nova Scotia ore; yet, when only slightly heated, they gave out copious fumes of sulphur. Except the pure hydrated peroxide of iron, called "black brush," found in Dean Forest, I have never met with any British ore which in the bulk was not contaminated with a large per centage of foreign, and often obnoxious, matter. The Nova Scotia ore, on the other hand, in the rough and unpicked state in which it was forwarded to me, does not contain 3 per cent. of impurities, including moisture, and it is perfectly free from sulphur, which, in almost every other instance, contaminates the micaeous ores of iron. As to the facility of working this ore, I may observe, that I have myself been a miner, and have wrought as a common miner, in iron mines; and, from my own experience, I can affirm, that a miner could, in eight hours, raise four times as much of the Nova Scotia ore as he could of that belonging to Sir T. Lethbridge, and which is the only ore hitherto discovered in this kingdom which can bear any comparison with the former. Supposing, for a moment, that England really possesses a mine of equal extent, and ores of as unusual a purity, how is the charcoal, necessary to smelt this ore into pig-iron, upon a large scale, to be obtained? The want of this charcoal here, and its abundance in Nova Scotia, appears to me a very sufficient reason for the drain of capital which Mr. Radley deprecates, when the principal object in view is to manufacture charcoal pig-iron. I am glad that Mr. Radley is at length so explicit respecting his steel process; and, as it applies equally to every description of ore, why he need not trouble himself about these inaccessible haematises and specular ores; and indeed this process, so universally applicable, must needs defeat all others, and become itself of no value, from want of competition.

If the process be really thus comprehensive, and can be carried on secretly, I should advise the British Government to buy the invention cheaply at 1,000,000/- sterling; and, by supplying the world with cheap steel of first-rate quality, they may realise a revenue greater than that afforded by the obnoxious income-tax.—ROBERT MUSHET: Coleford, June 19.

## CAST-STEEL.

SIR.—A compendium of Mr. R. Mushet's treatise on steel, in your last Number, a metal so little known, may be of practical use. Blistered steel is a mixture of true steel and malleable iron. When pieces of this mixture are fused in a crucible, the fusion does not commence round the sides where the heat is applied, and gradually pervade the mass; but the malleable iron part of the mixture, by a peculiar affinity, aggregates itself together in the centre of the circumnavigated fluid. Porosity in the centre of an ingot is produced by shrinkage from the speedier cooling of the extremities; but it is, at the same time, produced by a different cause—viz.: the presence of masses of ill-fused malleable iron, which are more adapted than liquid metal to receive the cellular impress of an aeriform fluid. Pure malleable iron is of less specific gravity than a compound of carbon and iron, and it floats upon the latter denser medium, either in the refinery or the blast-furnace. Malleable iron floating produces exactly the same effect upon steel, refiner's metal, and pig-iron, as is proved, when we find one porous in the centre, the other two on the surface. An increasing excess of this floating malleable iron produces the honeycomb in No. 2 pig-iron, which is proved by there being no honeycombs in white iron, which is the next stage of the process. The value of pig-iron does not depend on the perfection of the smelting operation, but on its imperfection. In proportion as the materials are crudely and insufficiently deoxidised and carbonised the iron will be strong; but if the process, for which the blast-furnace is constructed, be thoroughly and efficiently carried out, the result will be pig-iron weak, and of less value, as the Scotch iron. There is no correspondence found, in any locality, between its pig-iron and the bar-iron produced therefrom, because the goodness of pig-iron depends solely on the bad conduct of its manufacture; nor did Mr. R. Mushet, as I can recollect, ever give a detailed account in your pages how each metalloid, according to the proportions of its alloy with pig-iron, was the influencing cause of the varieties we recognise in practice.—FREERUS: June 20.

## FLYING MACHINES.

RESPECTED FRIEND.—I presume that those who are acquainted with the history of flying machines will be surprised on finding, that another proposal for realising this old idea is again afloat. The plan proposed by Mr. Pittet, as described in your last Journal, although ingenious, is, after all, but a modification of those already tried without effect. It is certainly probable that we could take a trip of a few hundred miles at a rapid rate, in such a machine as he proposes, "wind and weather permitting;" but to fly across the sea at the rate of 60 miles per hour, with a gale blowing a-head at a nearly equal rate, is another thing. The resistance which the surface of the balloon would offer, would be, probably, equal to that of a vessel at sea; and I believe that two paddles, whirling in the air, would not even cause the vessel to move; but, although aerial navigation does not promise to be of much use, the real flying machine is already discovered—we have it in the atmospheric railway; and by this mode we have all the advantages of flying, without the inconveniences—while with the balloon system it is *vice versa*; and when railways are constructed on that principle with a perfect tube, we will hardly require a more perfect mode of travelling, at least for some time to come; the problem has been already solved, and the perfecting of the plan, or at least an approximation to it, in all probability left to Clarke and Varley, in spite of the numerous plans before the public, unless the longitudinal opening be dispensed with entirely.

The plan of Hallette would, I am confident, answer no better than that of Samuda; but, perhaps, the cause of the air penetrating into an apparently air-tight vessel is not altogether understood, even by many of those who have obtained patents for different valves. If we attempt to drive air

through the longitudinal opening of a tube, when it seems perfectly closed, we may not succeed, although a powerful apparatus may be used; but let the air be exhausted from the tube, and the air from without will rush through the opening, and, if left for some time, the tube will be filled with air. The cause of this is simply because the air rushes in a vacuum at a density infinitely below that of the atmosphere, by expanding, as it were, without limit, on reaching the vacuum—so that the more perfect the vacuum, the more rapidly will the air rush into it. This, of course, will render the construction of a perfectly air-tight tube a matter of great difficulty; but it will be universally conceded, that no engineers have done so much for attaining this end as Clarke and Varley; and it is to be hoped that they will soon put the world in possession of the real flying machine.

6th mo. 20th.

JOHN DE LA HAYE.

## PATENT RIGHTS.

SIR.—There does not appear to be any cause for apprehension, that in altering the law of patents, matters may be made worse than they really are at the present time. It is scarcely possible that any change in the law of patents can place the patentee in a worse position than that which he now occupies. One great defect is the total want of stringency in the penal law, when patent rights are pirated. When a man has perfected an invention, and has secured a legal title to it by letters patent, the invention is, to all intents and purposes, as much a part of his property as the watch he carries, or the clothes he wears, only far more valuable to him—for, if the latter possessions should be purloined, they may be replaced; but the loss of a patent is irreparable. Yet, if a highway robber be convicted of openly stealing a watch, he is condemned to transportation for life, and his offence is *felony*—whilst he who meanly and stealthily violates the Eighth Commandment, by taking away his neighbour's property, in the shape of a patent right, is merely liable to an action at law for damages; and even then, should the aggressor happen to be a wealthy, and the inventor a needy man, it is next to a miracle, owing to the rank corruption which pervades every branch of the law, if the inventor should obtain a verdict in his favour. It is *felony* to steal a watch, and it ought to be *felony* to purloin a patent. Were this to pass into a law, an inventor would feel that he could claim protection—whilst those who do not blush to be guilty of the degrading meanness which must ever characterise a patent pilferer, in comparison with whom the "swell" who gains his livelihood by picking pockets, may be considered an estimable member of society, would *fear* to incur the punishment due to *felony*.

Again, in case of disputed right, some wretched legal quibble often ruins the cause of the inventor—thus the use of charcoal and manganese in a particular process, instead of carburet of manganese as specified in a patent, proved fatal to the rights of that patent, yet carburet of manganese is neither more nor less than charcoal and manganese. Inventors, however, who have published their ideas gratuitously, ought not to complain when they find that others have improved upon the hints they have thrown out, and have established for themselves a patent. The percussion of steam was, I think, employed by Mr. Perkins long before Mr. Radley published his paper in 1841; perhaps Mr. Radley's method of percussive steam-hammer had its ideal origin in the experiments of Mr. Perkins.

Coleford, June 20.

ROBERT MUSHET.

## THE ATMOSPHERIC RAILWAY SYSTEM.

SIR.—I perceive that some gentlemen, favourable and unfavourable to the atmospheric railway system, have been lately submitting their respective sentiments and experience on the subject through the medium of your excellent Journal. There are letters from two gentlemen in your last Journal—one from Mr. Thomas Clarke, in which he says, in reply to "A South Devon Shareholder," that "We (Clarke and Varley) expect to have a line to lay down, in a few weeks, which will most completely establish its superiority over every other system of propulsion yet brought under public notice." In reply to the same inquirer, Mr. James Baverstock, in the same column of your Journal, says—"As to the system of propulsion (atmospheric), it is more than decided to be bad, and may be summed up, as costly in construction, uncertain in action, not durable in wear, and profited in adventure, and the sooner laid aside the better for all parties."

By placing these two paragraphs in juxtaposition with each other, your readers will be puzzled how to decide between their extreme antagonism—both professing to be the result of practical experience, and yet, on the same subject, so contrary to each other. It is not my intention to support the one, or condemn the other; in each I believe there is a mixture of facts and fiction. My principal object is to direct the attention of the "South Devon Shareholder," and the public in general, to a new mode of railway propulsion, which I have been led to examine, in consequence of the report of the "British Inventors' Protecting Company," inserted in your Journal two weeks ago. This deserving company have published their report in a pamphlet, well worthy the attention of those interested in railways, from which I take the following extract:—

"THE NEW ATMOSPHERIC AUXILIARY RAILWAY APPARATUS.—The original outlay and cost of working this apparatus will not exceed one-third of any atmospheric system now before the public; very little stationary power will be required, and that power obtained and applied in the most economical manner. The practical working power will be from 12 to 14 lbs. per inch, being double the pressure obtainable by the present atmospheric railway apparatus, and leakage will be almost entirely prevented; it also affords the greatest facilities for retarding or stopping the trains without the slightest loss of power."

"THE NEW RAILWAY TRAIN FROPPLE.—By this simple, but powerful, apparatus, trains can be propelled, on rails, without either locomotive or stationary engines, and with greater speed and safety than by any system now in use."

"A NEW AIR-PUMP.—This pump will be perfectly free from leakage, and, as near as possible, without friction; it will form a valuable and important adjunct to the atmospheric system."

I have been kindly permitted to examine this new mode of railway propulsion, the invention of Mr. John Weston, who has obtained a patent for it, by the assistance of the Inventors' Protecting Company; and I have no hesitation in saying, that it will be well for any party about to lay down a new line of railway to examine it also, as I feel confident that it is simple in construction, speedy and safe in travelling, cheap in its original cost, and also in its working. I may add, that any gentleman desirous of obtaining the same information on the subject, which I have had from the inventor, will also be satisfied, by applying to the secretary of the British Inventors' Protecting Company.—PUBLICOLA: Fleet-street, June 21.

## NEW APPARATUS FOR RAISING WATER FROM DEEP MINES.

SIR.—Having observed in your useful Journal an article on Messrs. Clarke and Varley's patent apparatus for raising water from deep mines, I have perused the same with much interest; and, although I do not mean to say that it is impossible to raise water by atmospheric pressure, I certainly do not know how the thing can be accomplished in the way laid down; and, as you are always willing to oblige your numerous readers, have you any objections to giving us a diagram, as the thing appears so novel? I have no doubt many, as well as myself, will be interested in it.

J. D. T. MANCHESTER, June 15.

[The description which we gave of this water-raising apparatus in the *Mining Journal* of May 27, we consider so clear and concise, that we cannot see the necessity of giving a diagram; nor do we see how we can better explain the subject, if "J. D. T." cannot comprehend it, so exceedingly simple does it appear to us. In the first instance, the water is raised, by hydraulic pressure, to a height, we have assumed, of 20 ft.; but, on opening communication with the atmosphere, the pressure beneath the diaphragm will raise a weight above it, was it water, or any other substance; as long as the exhaustion is continued above in the air-tight cistern, so will this diaphragm, or piston, with its weight, be lifted by a power proportionate to the degree of exhaustion, until it reaches the top, when the water will flow over into the cistern, and which can be removed by opening the valve, when it will run off, and the equilibrium being restored in the air-pipes, the loose valve will fall to the bottom, and be ready for another operation.]

## WASHING METALLIC ORES BY CENTRIFUGAL FORCE.

SIR.—Among the various methods proposed and in use for dressing ores, it appears to me a great improvement might yet be made. Would not a much more expeditious course be found in the application of centrifugal force to the washing of tin and other ores? I propose large metal pans, or wooden tubs, of (say) 5 ft. diameter; every pair to contain six revolving fans, or vanes, more or less—the velocity, and the extent of the angle, depending on the specific gravity of the metal, which is to be thrown at a point near the centre where the water flows. The vanes revolving rapidly will, by its centrifugal force, throw the lighter particles towards the periphery, where they will be washed away by the overflowing waters, the heavier or metallic particles remaining nearer the centre.

Penzance, June 20.

A. T. J. MARTIN.

[We believe a plan on this principle has been tried both on the tin ores of Cornwall and the gold washings of the mines of South America; but was found utterly to fail in accomplishing the objects sought—such as a classification of the ores, according to richness—and thus obtaining two or three heaps of ore each of nearly uniform quality, but different in degree of richness.]

## IMPROVEMENTS IN SMELTING COPPER ORES.

SIR.—Though unwilling to obtrude myself in your columns with matter somewhat too personal, I am compelled, by the contents of Mr. Bankart's last letter, to make a few brief remarks. A part of the contents are to me unintelligible—which, with the rest of his letter, clearly show that the hint I tendered to him he has not availed himself of. Mr. Bankart will find that, so long as Cornwall furnishes copper ores, which contain six times the quantity of sulphur necessary to form a sulphate of copper, there is not the smallest probability of my process requiring his aid. Regarding Mr. Bankart's observation—that mundic-kilns are not new—I have never presumed to say that they were; on the contrary, I have said, in my specification, they are well known. He has, therefore, a much foundation to impugn my patent as those who would the merit of Watt, by saying, there was nothing in his invention—the condenser—as steam-engines were not new; or of Capt. Trevithick's steam-boiler, as steam-boilers were not new; or, more recently, of Mr. Neilson's hot-air, because, forsooth, smelting-furnaces were not new. I am not surprised, however, at Mr. Bankart attempting to shift from calling my patent a direct infringement—to characterising it as nothing new; it is just as I expected from him.

I recommend Mr. Bankart to try whether he can, by following what I have stated, precipitate 2 lbs. 5 ozs. of copper per hour by square foot of iron; he will, on this portion, get no foolish threat about infringement from me. He has only to get a leaden pan, containing a boiling acid solution of the sulphates of copper and iron; then to put in a square foot of iron, weighing about 6 lbs., maintaining, as near as he can, the strength of the sulphate of copper by fresh solution, and I have no doubt the result will immediately induce him to lay aside his apparatus.

If Mr. Bankart will but look at Mr. Phillips's report of the experiment at the Cobre Wharf, he will find that I have not exaggerated the cost. Mr. Phillips states, the quantity of dry copper precipitate obtained to be 1 ton 4 cwt. 0 qrs. 18 lbs. The furnaces took for the operation: of coal, 7 tons 10 cwt. 2 l. 4s. 3d.; for labour, 10l. 2s. 6d.=12l. 6s. 9d.—"The quantity of iron required to precipitate a ton of copper is 17 cwt. 2 qrs. nearly." "In this estimate the iron required for precipitation is not included." Any of your readers will infer, that the cost of a ton of copper precipitate, exclusive of the iron for precipitating, is fully 9l. 18s. 8d.

W. BIRKMYRE.

## BORING BY STEAM.

SIR.—In reply to the communication of Mr. W. Gard, of Goldsworthy Cottage, of the 3d instant, I have furnished a full description of our patent machinery for boring Artesian wells, &c. He has now the opportunity of showing how far his apparatus is not an infringement upon ours, and how far it is superior to it. He accuses me of having "assumed a great deal." I certainly did assume, that the description given in the *Mining Journal* and *Mechanics' Magazine* was a correct one, which led me to believe it an infringement; and as he does not, or has not, given in the description his *peculiar claim*, I should feel obliged by his doing so, as it might be satisfactory to many of the numerous readers of the *Mining Journal*, who are interested in these improvements.

C. MATHER.

*Salford Iron-Works, June 15.*

[We have given the description of Messrs. Mathers' invention as detailed as we can; and shall be happy to show the drawings to any correspondents who may call at our office.]

## IMPROVEMENTS IN WROUGHT-IRON.

[Specification of patent granted to William Rocke, of Dudley, Worcestershire, for a new mode of treating and applying wrought-iron. Patent dated Nov. 18, 1847.]

The patentee, in describing his mode of treating wrought-iron, commences, by stating that he takes scraps, or pieces, of wrought-iron, and melts them in a cupola furnace with soft fan-blaze, or in a reverberatory furnace, in the same manner as pig or cast-iron is melted. If small quantities are required to be melted, a pot or crucible furnace will be most convenient; and having moulded the article to be made in the manner usually practised in iron-foundries, he pours the molten iron into the mould. The article thus made being hard and brittle, and deficient in the malleable property, Mr. Rocke proposes to treat, or anneal, in the furnace, such as is used for converting bar-iron into steel, or other convenient furnace, or kiln, in which the heat can be regulated, so as to restore the malleable property; and the articles to be so treated he places within a box of iron, surrounded by bricks, or within a casing of bricks, leaving space to surround it with Cumberland red ore, or other iron ore, or charcoal, mixed together, and ground fine; or the articles may be covered with this mixture without such casing, and in this state he submits them to a sufficient degree of heat to restore the malleable property; and to determine the state of the process, the patentee employs a trial bar, which may be withdrawn from time to time, to ascertain the degree of malleability which the mass has attained. For making articles which do not require to possess the density and texture of wrought-iron alone, he mixes therewith cast-iron in various proportions, according to the nature and requirements of the article, taking care that the proportion of the cast-iron, in no instance, exceeds the weight of the wrought-iron; and in making articles which require to take the nature and temper of steel, he mixes with the wrought-iron steel in various proportions, according to circumstances—the proportion of the steel never exceeding the weight of the wrought-iron; and he pours the molten metal into moulds, and subsequently submits it to the annealing process in the manner before described. In conclusion, he states that, having described the nature of his invention, and the manner in which the same is to be performed, he does not claim the melting of wrought-iron, as that has already been practised to a limited extent; but what he claims as his invention, is the treating and applying wrought-iron, by melting the same by itself, or with cast-iron and steel, and the reproducing malleability in the castings of the molten iron, by annealing the same as above described.

*Patent-office and Designs Registry, 210, Strand, June 20.*

*METAL STRAPS FOR WOOD BLOCKS.*—An experiment took place, in Woolwich Dockyard, on Wednesday last, at Bramah's-chain testing machine, to compare the strength of Bothway's iron and brass straps, for wood blocks used in the navy. One pair of iron straps, 7 in. long, and weighing 2 lbs. 13 ozs., the first tried, sustained a strain of 11 tons 15 cwt. previous to one of the pins that held them together breaking. The

**On the Winning and Working of Collieries.**

BY MATTHIAS DUNN, MINING ENGINEER.

No. IX.—Continued from the Mining Journal of the 17th June.

**BORING.**

Having, in the introduction, placed before the reader a general idea of the disposition of coal-fields, and shown that many extensive mines of coal are so embedded in alluvial matter, that no correct judgment can be formed of their existence from visible outcrop, it becomes advisable to ascertain the depth, nature, and thickness by boring; for, without boring, neither the engine-power nor other expenditures which may be necessary to attain the desired object, can be estimated. Various new methods have been suggested from time to time in this important branch of mine engineering; but, I am not aware of any material improvements that have been effected, superior to the system which has been pursued from time immemorial—viz.: by the common cutting chisel and whimble. Therefore, in conformity with the plan of this work, I will proceed to enumerate the principal implements employed in this process, with the mode of using them; and, in so doing, I request such of my readers as are well acquainted with these details to excuse prolixity, and to bear in mind that I am writing for all classes of readers, as well as for those of the profession.

**IMPLEMENT USED IN BORING.**—1. Brace head, with short rod attached, which is used for lifting and working the rods.—2. Bore rods of best iron, about 1 in. square, and of different lengths, each rod having a male screw at one end and a female screw at the other.—3. Chisels, also fitted with screws, well tempered with steel, with a face of 2 or 2½ in., according to the size of the hole intended to be bored, are generally 18 in. in length.—5. Wimble, a hollow iron instrument similar to an auger, whose cavity is from 8 to 10 in. in length, with an opening up one side, with partial overlap, the better to receive and hold the chopped strata.—6. Rest, an instrument whereon the rods rest upon the boring box, whilst screwing and unscrewing.—7. Screw-keys, for screwing and unscrewing the rods.—8. Boring box of wood, a little larger than the hole, which serves to direct and rest the rods.—9. Topit, for quickly attaching to the rods, for lifting &c.—10.11. Right and left handed worm screws.—12. Runner attached to the winch rope.—13. Boring frame or triangles, 20 to 30 ft. high, to which are applied jackroll and sheave, for raising and lowering the rods, and for disjoining into convenient lengths.

Besides these, many other small apparatus are used, according to the inventive genius of the borer, to recover the rods in case of breakage, or to unscrew them in case of becoming fastened; while, in boring through sand or in running strata, sheet or cast-iron pipes are applied, for the preservation of the boring, sliding within each other like the parts of a telescope.

In deep borings the operation becomes critical and increasingly expensive, as the following scale will show:—1st 5 fms., 7s. per fm.; 2d ditto, 14s.; 3d ditto, 21s.; 4th ditto, 28s.; 5th ditto, 35s.; 6th ditto, 42s.; 7th 5 fms., 49s. per fm.; and so on. Extra charges are made for conveying the rods, fixing the apparatus, or boring through whin or other extraordinary hard metals.

Practised borers can ascertain with the greatest nicety the nature and thickness of the strata bored through, and form a very correct opinion as to the nature of the feeders of water met with in the process. It is, moreover, justly considered a very onerous and important duty, inasmuch as a false or ignorant account of strata may lead to ruinous expenditure and irretrievable disappointment, which has not unfrequently occurred. The late Mr. Ryan patented an improvement in boring, which had for its object the taking out the strata in a core similar to the boring of a cheese; but, on being tried upon stone, it proved utterly impracticable. As to boring in clay or coal, that operation is generally executed by the wimble. In the month of July last, a patent was taken out by Mr. James Taylor, of Farnival's Inn, for improvements in boring—the specification of which appeared in the *Mining Journal* at the time.]

The cuttings executed in the generality of borings are not in the shape of distinct particles, inasmuch as, by the application of water either from the surface or in the bore hole, the cut strata present the appearance of mud, and not of distinct particles—hence the difficulty which will occur for such a composition to find its passage up so narrow an inlet as Mr. Taylor's tube. In boring through coal it might be more applicable, because the particles are more apt to be retained in pieces; but, for this purpose either the wimble or a chambered chisel is used, similar to the apparatus for which this patent was obtained. Mr. Stott, of Ferry-hill, the principal borer in this part of the country, assures me that he has frequently applied a chambered chisel, chiefly with a view to preserve the particles of coal as much as possible, and to guard against the effects of the inflammable gas, which is frequently so considerable in the first tapping of a seam of coal that it is difficult to retain specimens. Much, therefore, depends upon the strata bored through, as to whether this invention may be made practically useful. Another method of boring is practised with rods, which are three times the weight of those used in the north of England. A lofty scaffold is raised, whereon the borer stands to work the rods, which are lifted by means of a winch with unerring apparatus, the effect of which is, that after the rods are sufficiently elevated they are suddenly let go, and, by their weight and extra strength, cut the strata with increased effects. The height of the scaffold, to which there is a convenient stair, permits the rods to be fitted together in greater lengths than otherwise, thereby adding to their strength, and at the same time diminishing the chance of accident. Borings have been frequently executed in this part of the country to a depth of 130 fms.; but, where that is intended to be the case, a shaft is generally sunk to an indefinite number of fathoms, in order to expedite the work by unscrewing the rods in greater lengths, or where the bottom of a coal shaft can be made available, the proving of the lower strata is thereby greatly facilitated. It frequently becomes necessary in mining, to bore holes upwards, which is effected for short distances with great facility by means of the break or lever, inasmuch as the hole clears itself without the intervention of the wimble. In boring contracts, exceptions are made with respect to charge in which whin or other exceedingly hard strata intervene. It often happens that both hole and rods are lost by the unscrewing of the joints or the rods becoming fastened by the falling in of loose stones, or by projections of the rugged strata at trouble, &c., to avoid which in deep borings the most consummate care and experience are required. In prosecuting borings through alluvial substances or soft strata, it is proper to secure the bore holes by means of pipes of wood or iron, the hole being enlarged accordingly, and as the power of driving down the pipes is limited, recourse is had to the insertion of one length within the other, upon the principle of a telescope. So important is the process of boring, and so changeable and uncertain is the disposition of coal-fields, that prudent persons do not satisfy themselves with one boring, but by executing a succession of borings to some well ascertained seam, a fair opinion may be formed of the direction and amount of the dip and rise, as also the nature of the roof of the coal. At the same time the intervention of slip dykes often renders such precautions nugatory, and misleads the speculator in regard to the disposition of the beds of coal. It is, therefore, only common prudence to bore a succession of holes to some upper seam, as it may be safely inferred that the principal seams lie parallel to it, whatever their relative depths may be. Boring is frequently resorted to in coal workings in which a waste is suspected, the boundaries of which are unascertained. These borings are necessarily horizontal, and as they might perchance be approaching a part of the workings of irregular shape, a pair of drifts are pushed on in advance of the main workings. In the leading drift a direct hole is kept continually six or eight yards in advance, and flank holes are bored upon each side to a similar length, such holes being resumed at every five or six yards. As the consort drift is kept a few yards behind the leading drift, certain of the holes may be safely dispensed with.

As soon as a perforation into the waste occurs, the hole ought to be carefully plugged with wood; a new position should be taken up 20 or 30 yards back, and new boring drifts at right angles be made right and left until the position of the waste be completely ascertained, and within which lines all the interior workings may be considered safe. Notwithstanding these precautions, whether from occasional neglect or unforeseen accident, inundations have frequently taken place. Such, indeed, was the case at Heaton Colliery, in the year 1815; for, although the drowned waste had been thus ascertained during the course of many hundred yards, yet in an unhappy moment a failure took place in exploring through a fault, and water rushed in, to the destruction of nearly 100 men and boys, who were entombed in the upper parts of the mine, without the remotest chance of escape, and there the bodies remained for many months. The omission of boring where wastes were expected to be found, has often led to most disastrous results; for, although in many cases both the coal and the superior strata are so open that they indicate the vicinity of a drowned waste, long before

the workings are brought in contact with it, yet it is frequently the reverse, in consequence of both coal and stone being so completely watertight, that they exhibit no symptom of water till the communication actually takes place. In collieries, therefore, lying to the dip of drowned wastes of uncertain form and extent, a good system of boring is most necessary; for, when once the waste is proved, the water can be gradually let off to the pumping-engines, and an opportunity taken to drain it, and thus procure the coal which previously had been left as a barrier of safety.

[To be continued in next week's *Mining Journal*.]

**The Metallurgical Treatment of Ores.**By JOHN MITCHELL, M.C.S., author of *A Manual of Practical Assaying, &c. &c.*

[Continued from June 10.—No. XXI.]

**REDUCTION OF OXIDE OF ZINC.**—The oxide of zinc produced by any of the previous operations, is reduced to the state of metal by the aid of carbonaceous matter, and collected by distillation, either *per descensum* or *per ascensum*. In some works, wood charcoal or coke, in others powdered coal, is the reducing agent. It appears that the latter substance is best fitted for the purpose; for, in fusing, the coal is carried into the smallest interstices of the mixture, and the hydrocarbons produced by its decomposition furnish a reducing atmosphere extremely favourable to the decomposition of the oxide of zinc.

In Carinthia the distillation, *per descensum*, has been long employed. The furnace, or rather furnaces, in use, are four of the reverberatory kind, built together, and communicating with one chimney, which is placed in the centre. The sole hearth of these furnaces is formed of an iron trellis work; each opening in this receives an earthenware tube, to carry away the reduced zinc—the whole of these tubes forming an entire sole hearth, and completely protecting the iron work from the direct action of the fire. On these conducting tubes is placed another earthenware tube, of a conical shape, which contains the mixture of oxide of zinc and the reducing agent. This cone is so arranged on the conducting tube, that its broadest end is upwards—the only opening in it being at the lower, or smaller end. Each sole hearth holds 160 cones and conducting tubes; but the four ranges furthest from the fire are filled merely with empty tubes, which are baked during the firing, and are then fitted for a reduction operation. About one-third of the tubes are destroyed each charge. Under the sole hearth of the furnace sheet iron trays are placed, for the purpose of receiving the reduced zinc: they are so arranged, as to be as close as possible to the mouths of the conducting tubes, in order to prevent the access of atmospheric air; for if large quantities were admitted, much zinc would be burnt, and reconverted into oxide.

The nature of the charge for the different ranges of tubes varies according to their distance from the fire:—

	Four ranges near the fire.	Two following.
Roasted calamine	... lbs. 1820	520
Wood charcoal	.....	504
Salt	.....	224
Water charged with 1-200th of potash	.....	36
	280	16

The four first ranges comprise 64 cones, the two following but 20, because some of the spaces are never filled up. In each operation two of the combined furnaces are in work—that is to say, 168 cones of mixed ore are being submitted to distillation. Beech wood is the fuel employed, and about 2000 cubic feet are consumed in one operation, which lasts from 30 to 36 hours. The product of zinc collected in the iron trays is about 800 lbs. This system of working being intermittent, causes a great waste of fuel, and breaking up of the cones and conducting pipes.

At Bristol, Birmingham, and Sheffield, the method *per descensum* is also employed. In some works the calamine is roasted, as already described in our last week's *Journal*; in others, it is at once mixed for reducing with its own weight of small coal. This process is not, however, to be recommended, for the reasons already pointed out.

The reduction furnaces are either round or rectangular, and contain from six to eight pots. The circular furnaces are the most easily worked, and generally contain only six pots. The furnaces employed are similar to those in use at glass-houses. The pots are also prepared with the same care, and in much the same manner: there is also a constant supply of pots, kept red-hot in a furnace expressly for the purpose, in order that any one broken in the working furnace can be instantly replaced. The crucibles, or pots, are made of refractory clay and old crucible powdered finely. They generally last about four months. They are provided with an opening at the lower part, by which the reduced zinc passes into the conducting pipe. In charging them, the lower hole is stopped by a piece of wood, which soon carbonises, and the stopper of charcoal thus produced effectually prevents any of the mixture in the pot passing into the tube underneath.

The cover of the pot is left open for about two hours after charging, or until the bluish white colour of the flame evolved indicates that reduction has commenced. At this period it is closed with a plate of refractory clay, and a sheet-iron tube is attached to the lower part of the pot, to convey the reduced zinc to an appropriate vessel underneath the furnace. This vessel is occasionally filled with water, to hinder the falling zinc from being thrown about. During the whole time of the reduction of one charge, the only care of the workmen is to feed the fire, and prevent the tubes conveying the volatilised metal from being stopped up; occasionally, however, so much zinc collects in these tubes, that mere stirring will not remove it, and recourse must then be had to a red-hot iron rod, which must be introduced into the tube, and there kept until it is quite clear.

The zinc collected in this operation is in masses, and very fine powder; it is also mixed with oxide of zinc. The whole is fused in an iron vessel, and the oxide skimmed off and added to the heap of roasted ore for reduction—the metal is run into ingots. To cleanse the pots after each operation, the condenser is removed, and stopper of charcoal (before-mentioned) crushed by an iron rod; this done, the spent contents fall out, and the cleansing is finished by stirring the inside of the pot from the top, with an iron rod. To replace the condenser, a band of damp clay is placed in it, it is then forced against the bottom of the pot. In the condensing tubes very singular and beautiful masses of zinc are occasionally found—they vary from 1 to 4 inches in length, and are nearly an inch in diameter; they are cylindrical and deeply serrated, having a very considerable crystalline appearance. The formation of these masses is, however, of rather rare occurrence.

Five charges are made in about 15 days—from 6 to 10 tons of calamine are worked off, and from 22 to 24 tons of coal consumed—the produce in zinc is about 10 tons.

In Silesia, on the other hand, the distillation is *per ascensum*, and the calamine worked is always submitted to a previous roasting. These distillations are accomplished in earthenware muffles, placed in a reverberatory furnace, and communicating with a receiver outside. Two furnaces are generally joined or built up together, and each contains about 10 muffles. The preparation of the muffles requires a very refractory clay. It is first dried, then stamped and sifted, after which it is mixed with a third part of the fragments of old muffles, also stamped and sifted. The mixture is made when the two are perfectly dry, after which the whole is moistened, and allowed to remain from 10 to 15 days; and the same series of moistenings and reposes is gone on with several times before the mixture is fit for use. The after-preparation of the muffles is very simple; they are made by hand, of semi-elliptical shape; the workman makes at first the base, on a board, and then gradually builds up the two sides—making them about 1 inch thick. The manufacture of the beads, or necks, is also simple, and by hand; however, as it is not necessary that they should stand much fire, they are made of common clay, mixed with a third part of old and broken beads. The muffles being very gradually dried, are baked and heated to redness; and, while in that state, conveyed to the furnace in which they are to be used. In baking, or firing, the muffles, much care is required; the furnace employed is a reverberatory one. When they are entered, they are placed on fragments of brick, about 3 inches in height; as soon as they are thus placed, a small fire is made, which is kept up for three or four days—after which the heat is so gradually increased, that the greatest possible heat is attained about eight or ten days from the commencement of firing. The red-hot muffles are then taken out of the firing furnace and placed in the reducing furnace, in the following manner:—When the furnace door is open, a workman passes a thick piece of wood, or a bar of iron, under the muffles; he then raises it a little, it acting as a lever—another workman meanwhile removes the fragments of brick upon which the muffles previously rested; they are then brought near the door, by means of a rake, and slid on to a plank, some four feet longer than the muffle; one workman then seizes the plank at the end furthest from the muffle, whilst two others support the other end, by means of a transverse pole; and, in order that these two last workmen should not suffer too much by the heat radiated from the muffle, a fourth workman holds a kind of light shade over the red-hot mass. This also much protects the muffle from too rapid cooling.

When the muffles are carried to the distilling furnace, previously heated, their anterior parts are covered with a plate of clay. The neck is now fixed, and the changing commenced. Each muffle holds about half a cwt. of calcined calamine, which has been previously mixed with an equal volume, or about 22 lbs. of small coke. The charges are renewed every 24 hours. The fuel employed is coal, and the greatest possible temperature is attained. At the commencement of the operation, while the necks of the muffles are yet cold, a portion of zinc condenses and partially closes the passage of the receiver; this must be removed by means of a red-hot rod. The product of distillation is, as before observed, a mixture of metallic zinc and oxide of zinc. It is fused, and the melted metal cast into ingots, and the oxide reacted on in the muffle. There have been lately many patents taken out for new methods of working zinc ores; but with what success we have not heard.

In our next week's *Journal* we shall give the treatment of ores of bismuth, and commence that of antimony.

**COAL-MINING—THE WORLD UNDERGROUND.**

The science of coal-mining has participated largely in the improvements of the time. Among all the branches of our local industry there is none more interesting or attractive. Were its object simply to supply the domestic hearth with cheap and abundant fuel, it might well occupy a prominent place among those productive arts which contribute to social happiness; but in feeding the countless furnaces of trade, it forms the very basis of manufacturing prosperity, and is certainly the last element of its industry with which the country could afford to dispense. Inventive science, therefore, has seldom found a more useful or remunerative sphere than the coalmine. The more extensive application of machinery, and the practical study of geology, have tended of late to enlarge and deepen the process of excavation in a material degree. The comfort and safety of these subterranean domains have also been greatly improved, so that the labour of the pitman is neither so dangerous nor irksome as it used to be. Air courses, scientifically constructed, prevent the accumulation of noxious gases, and render each gloomy gallery a highway for the winds of heaven.

Our interest in this subject has been excited by a visit which we have just had the privilege of paying to the deepest coal mine in Scotland, which is also one of the most extensive and complete. We allude to Nitshill Colliery, the property of the Messrs. Coats. This spacious mine is entered by two shafts, situated at a distance from each other, on the surface of the ground, of about a quarter of a mile, both shafts being in constant use. Until very lately there were two distinct pits; but by an energetic operation, confined during four months literally without interruption, a passage uniting them has been wrought underground, through the solid coal. The thoroughfare thus constructed averages 6 feet in height, 10 feet in breadth, and being somewhat tortuous, is fully a mile long. Before penetrating into these regions of darkness, our curiosity had elicited the following particulars. The seam of coal found here belongs to the Clydesdale basin, which our readers will be aware is one of the three great coal measures of Scotland. It crops out at the surface of the earth, at the distance of about a mile to the north-west of the Nitshill workings, and extends in a north-easterly direction towards Campsie, at which place it is seen and wrought. The same seam is also found in different parts of the country. An unbroken expanse of coal thus traced, widely traversing the face of the country, and available at different positions, constitutes one of those territorial gifts which warrant the assumption that the industrial prosperity of Scotland is destined to endure for a long series of years. The single field appertaining to the mine to which we now allude, is of itself capable of an enormous yield. It extends over 300 acres of ground, and passages having been driven in all directions, nearly to the boundary line, it is considered morally certain that the whole expanse consists of one unbroken sheet of coal. The average depth of the seam being 6 feet, some idea may be formed of the gross bulk contained in the space of 300 acres. With the two shafts in full operation, no fewer than 400 to 500 tons of coal may be drawn every day out of this mine. But here the question naturally occurs, how long can this process last? The proprietors estimate that they have already excavated to the extent of 10 solid acres, and with this fact before us, we will take the liberty of calculating the prospective resources of the mine. A square yard of the coal weighs, we are informed, 20 cwt., and the seam being 6 ft. in average height, it follows that the 10 acres already excavated contained 121,686 square yards, or just so many tons of coal. The same method of computation shows that the remaining 290 acres comprise the enormous quantity of 3,828,933 tons—a quantity which ensures a yield of 200 tons per day, uninterruptedly during the period of 57 years.

We descended into the mine by the Victoria shaft, which measures 1038 feet, or nearly a quarter of a mile in perpendicular depth. It is divided in the centre by a wooden partition or "mid-wall," giving the appearance of two shafts. For the purpose of safety and compactness, these trifling apertures are lined with timber nearly to the bottom, two of the sides being furnished with projecting rails or "spears," on which the iron cage, freighted with coals or colliers, glides silently up and down—one sinking while the other ascends, like the scales of a great balance. Our idea of a coal-pit had always been associated with a little rickety engine, jingling away in fury as if its component parts were undergoing a process of dismemberment. Here, however, we beheld the work performed by an engine of 80-horse power, the gentle and whispering play of which sounded like a pleasing melody. The pair of ropes at present in use weigh 5 tons, measure 210 fathoms, and cost 270. Contiguous to the works are several ranges of neat dwellings, also belonging to the proprietors, and forming a little village appropriated to the colliers and their families. The houses have all the appearance of cleanliness and comfort. Groups of lively children occupy the ground; and comely matrons may be seen at the doors, awaiting, it may be, each the return of her better and blacker half in grim array from the nether earth, and ready to receive him kindly—though not, let us hope, in her arms!

Although we had not previously visited a coal-mine, we felt our timidity vanish as we stood for a time contemplating the regularity and completeness of the arrangements. All being prepared, our little party arrayed themselves in a variety of picturesque habiliments, which certainly deprived the group of the remotest semblance of gentility, and we entered the cage without trepidation, under the guidance of the managing proprietor, Mr. George Coats. The signal being given, we receded from the light of day, with a motion as soft and gentle as if, like Oberon or Titania, we bestrode a falling leaf. To those who are not influenced by a sense of danger, the sensation experienced during the descent is very pleasing and agreeable; the speed of the movement not being apparent, except when the light of the lamp reveals the dark indentations on the shaft, as they seem to shoot upwards into the gloom. In a moment the brightening glare of the lamp showed that we had entered into darkness; presently drops of water exuded from the fissures in the shaft—and when we reached the bottom, it seemed as if the clouds were sending down a smart shower of rain. Here we were shown a well, into which all the water runs. It is sufficiently large to contain the accumulations of a month, but is emptied every Saturday evening by means of buckets, in which the contents are drawn up. This immunity from the troubles of accumulating water, is one of the great natural advantages of these workings, and is owing in some measure to the intervention of a wall of lava, or "trap dyke"

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Mines.	Engines.	Length of stroke	Load in pounds.	Load on pist.	Strokes per min.	Consump. of coal in bus. lbs.	Million lbs. lifted 1 foot by consum. of 1 bush. coal	Average quantity of water per min.	
W. Wh. Treas.	40-in.	9 ft.	24,185	17 ft.	9 ft.	1512	59 ft.	476	
Great Work.	Leeds's 60-in.	9 ft.	47,020	12 ft.	9 ft.	2088	61 ft.	228	
East W. Croft	Trevenson's 80	10 ft.	85,520	12 ft.	7 ft.	1876	62 ft.	243	
Carn Brea.	76-inch	7 ft.	81,548	13 ft.	4 ft.	1874	55 ft.		
Ditto.	Sims's 90&50	9 ft.	57,392	22 ft.	5 ft.	1558	61 ft.	539	
Poldice.	Inch comb. 3	10 ft.	75,563	9 ft.	9 ft.	3808	54 ft.	688	
Andrew & Nangier.	Sims's 85-inch	10 ft.	51,023	10 ft.	4 ft.	1230	56 ft.	256	
United Mines.	Taylor's 85-in.	11 ft.	97,108	15 ft.	6 ft.	2922	80 ft.		
Ditto.	Cardozza's 90-in.	9 ft.	99,468	13 ft.	7 ft.	4266	55 ft.		
Ditto.	Eldon's 30-inch	9 ft.	13,631	16 ft.	8 ft.	510	69 ft.	2009	
Ditto.	Loun's 85-inch	10 ft.	89,320	11 ft.	8 ft.	4282	54 ft.		
Ditto.	Hocking's 85-in	10 ft.	99,113	14 ft.	7 ft.	4399	58 ft.		
Per. St. Geo.	Sims's 60&100	9 ft.	90,279	28 ft.	7 ft.	3657	61 ft.	1355	
East Wh. Rose.	Inch comb. 3	10 ft.	57,931	13 ft.	4 ft.	1358	69 ft.	659	
Ditto.	Penrose's 70-in.	10 ft.	62,393	14 ft.	6 ft.	1578	66 ft.		
Wh. Mary Con.	63-inch	9 ft.	30,234	9 ft.	6 ft.	1168	55 ft.	253	

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17.60	13.57	13.7	11.55	10.45	9.90	9.75	9.50	9.40	9.35	9.28
13.57	13.57	13.7	13.57	13.57	13.57	13.57	13.57	13.57	13.57	13.57
11.35	10.47	10.47	10.47	10.47	10.47	10.47	10.47	10.47	10.47	10.47
9.82	8.89	8.89	8.89	8.89	8.89	8.89	8.89	8.89	8.89	8.89

#### COAL MARKET, LONDON.

PRICE OF COALS PER TON AT THE CLOSE OF THE MARKET.

MONDAY.—Carr's Hartley 15—Chester Main 13—Davidson's West Hartley 15—Dean's Primrose 12 3—East Adair's Main 12—Hastings Hartley 15—Holywell Main 14—New Tanfield 13 6—Ort's Redheugh 12 9—Tanfield Moor 14—Tanfield Moor Butts 12 9—Powell's Duffryn Steam 19 3 to 19 6—Snaptorpe 13 6—Sidney's Hartley 15—Wansborough Park 11 9—Wall's End Riddell's 14—Washington 13 6—Bradyhill's Hetton 15 6—Bell 15—Henton 16 3—Russell's Hetton 15 9—Stewart's 16 3—Whitel 14 6—Hudson's Hartlepool 14 6—Hough Hall 14 6—Hunwick 12 9—South Durham 14—Tees 16 3—Ships at market, 53; sold, 44.

WEDNESDAY.—Bate's West Hartley 14 6—Biddle's West Hartley 14 9—Chester Main 13—Davidson's West Hartley 14 9—Dean's Primrose 12 3—East Adair's Main 12—Hedley's Hartley 13 6—Hastings Hartley 14 6—Holywell Main 14 3—New Tanfield 13 6—North Percy Hartley 14 6—Ort's Redheugh 12 9—South Peartree 12—Tanfield Moor Butts 12 6—Walker's Primrose 12—Wylam 14—Wall's End Bewicks and Co. 14 3—Framwells 14—Gosforth 14 3—Harton 14—Killingworth 13 9—Eden Main 14 6—Lambton Primrose 14 9—Belmont 15—Bradyhill's Hetton 15 6—Bell 14 9—Haswell 16 3—Henton 16—Kepier 15 3—Lambton 15 6—Russell's Hetton 15 6—Shotton 15 3—Stewart's 16—Hartlepool 16—Hudson's Hartlepool 14 3—Thorney 14 6—Seymour Tees 14 6—South Durham 14—Tees 16—West Cornton 14 6—Derwentwater Hartley 14 6—Hartley 14 6—Powell's Duffryn Steam 19 6—Snaptorpe 13 6—Ships at market, 225.

FRIDAY.—Bate's West Hartley 14 6—Biddle's West Hartley 15—Davidson's West Hartley 15—Dean's Primrose 12—East Adair's Main 12—Hedley's Hartley 13 6—Holywell Main 14 3—North Pontop 12—North Hartley 14 6—Hastings Hartley 14 6—Holywell Main 14 3—Original Tanfield 12—Ort's Redheugh 12 6—Tanfield Moor 13 6—Tanfield Moor Butts 12 6—Townley 13—Walker's Primrose 11 6—Wall's End Bell and Brown 14—Framwells 14—Heaton 14—Riddell's 14—Belmont 15 3—Bradyhill's Hetton 15 6—Bell 15—East Hartley 13 9—Henton 16—Jonasson's 13 6—Lambton 15 6—Morrison 14 3—North Hetton Lyons 14 9—Russell's Hetton 15 9—Shorton 15—Stewart's 16—Caradoc 15 3—Hartlepool 16—Hudson's Hartlepool 14 6—Hough Hall 14 6—Kelloe 15 3—South Hartlepool 14 6—Thornley 14 6—Seymour Tees 14 6—West Cornton 14—West Hetton 14 6—Derwentwater Hartley 14 9—Hartley 14 9—Powell's Duffryn Steam 19 9—Snaptorpe 13 3—Ships at market, 131; sold, 86; unsold 45.

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